

Contents

Proceedings of the 21st International Conference on Plasma-Surface Interactions in Controlled Fusion Devices

Editorial, Y. Ueda, N. Asakura, K. Hoshino, A. Ito, S. Kajita, M. Kobayashi, H.T. Lee, T. Nakano and M. Tokitani	1	Tungsten transport and sources control in JET ITER-like wall H-mode plasmas, N. Fedorczak, P. Monier-Garbet, T. Pütterich, S. Brezinsek, P. Devynck, R. Dumont, M. Goniche, E. Joffrin, E. Lerche, B. Lipschultz, E. de la Luna, G. Maddison, C. Maggi, G. Matthews, I. Nunes, F. Rimini, E.R. Solano, P. Tamain, M. Salas, P. de Vries and JET-EFDA contributors	85
Impact of 3D magnetic field structure on boundary and divertor plasmas in stellarator/heliotron devices, M. Kobayashi, Y. Feng, Y. Xu, F.L. Tabares, K. Ida, O. Schmitz, T.E. Evans, H. Frerichs, Y. Liang, A. Bader, K. Itoh, H. Yamada, Ph. Ghendrih, G. Ciraolo, D. Tafalla, A. Lopez-Fraguas, H.Y. Guo, Z.Y. Cui, D. Reiter, N. Asakura, U. Wenzel, S. Morita, N. Ohno, B.J. Peterson and S. Masuzaki	2	Plasma wall interaction in long-pulse helium discharge in LHD – Microscopic modification of the wall surface and its impact on particle balance and impurity generation, M. Tokitani, H. Kasahara, S. Masuzaki, G. Motojima, M. Shoji, Y. Ueda, N. Yoshida, Y. Yoshimura, K. Nagasaki, N. Ashikawa, T. Mutoh, H. Yamada, LHD Experiment Group and S. Nagata	91
Plasma-surface interaction in the Be/W environment: Conclusions drawn from the JET-ILW for ITER, S. Brezinsek and JET-EFDA contributors	11	Active control of divertor heat and particle fluxes in EAST towards advanced steady state operations, L. Wang, H.Y. Guo, J. Li, B.N. Wan, X.Z. Gong, X.D. Zhang, J.S. Hu, Y. Liang, G.S. Xu, X.L. Zou, A. Loarte, R. Maingi, J.E. Menard, G.N. Luo, X. Gao, L.Q. Hu, K.F. Gan, S.C. Liu, H.Q. Wang, R. Chen, Z. Sun and The EAST Team	99
High density operation for reactor-relevant power exhaust, M. Wischmeier and The ASDEX Upgrade team and JET EFDA contributors	22	ELM mitigation with pellet ELM triggering and implications for PFCs and plasma performance in ITER, L.R. Baylor, P.T. Lang, S.L. Allen, S.K. Combs, N. Commaux, T.E. Evans, M.E. Fenstermacher, G. Huijsmans, T.C. Jernigan, C.J. Lasnier, A.W. Leonard, A. Loarte, R. Maingi, S. Maruyama, S.J. Meitner, R.A. Moyer and T.H. Osborne	104
Challenges and opportunities of modeling plasma-surface interactions in tungsten using high-performance computing, B.D. Wirth, K.D. Hammond, S.I. Krasheninnikov and D. Maroudas	30	Hybrid simulation research on formation mechanism of tungsten nanostructure induced by helium plasma irradiation, A.M. Ito, A. Takayama, Y. Oda, T. Tamura, R. Kobayashi, T. Hattori, S. Ogata, N. Ohno, S. Kajita, M. Yajima, Y. Noiri, Y. Yoshimoto, S. Saito, S. Takamura, T. Murashima, M. Miyamoto and H. Nakamura	109
Disruptions in ITER and strategies for their control and mitigation, M. Lehnen, K. Aleynikova, P.B. Aleynikov, D.J. Campbell, P. Drewelow, N.W. Eidietis, Yu. Gasparyan, R.S. Granetz, Y. Gribov, N. Hartmann, E.M. Hollmann, V.A. Izzo, S. Jachmich, S.-H. Kim, M. Kočan, H.R. Koslowski, D. Kovalenko, U. Kruezi, A. Loarte, S. Maruyama, G.F. Matthews, P.B. Parks, G. Pautasso, R.A. Pitts, C. Reux, V. Riccardo, R. Roccella, J.A. Snipes, A.J. Thornton, P.C. de Vries and EFDA JET contributors	39	Modelling of the material transport and layer formation in the divertor of JET: Comparison of ITER-like wall with full carbon wall conditions, A. Kirschner, D. Matveev, D. Borodin, M. Airila, S. Brezinsek, M. Groth, S. Wiesen, A. Widdowson, J. Beal, H.G. Esser, J. Likonen, N. Bekris, R. Ding and JET-EFDA contributors	116
Scaling of the divertor power spreading (S-factor) in open and closed divertor operation in JET and ASDEX Upgrade, A. Scarabosio, T. Eich, F. Hoppe, I. Paradela, B. Sieglin, F. Reimold, M. Rack, M. Groth, M. Wischmeier, G. Arnoux, I. Balboa, S. Marsen, the ASDEX Upgrade Team and JET-EFDA contributors	49	Implications of high density operation on SOL transport: A multi-machine investigation, D. Carralero, H.W. Müller, M. Groth, M. Komm, J. Adamek, G. Birkenmeier, M. Brix, F. Janky, P. Hacek, S. Marsen, F. Reimold, C. Silva, U. Stroth, M. Wischmeier, E. Wolfrum, ASDEX Upgrade Team, COMPASS Team and JET-EFDA contributors	123
Models of SOL transport and their relation to scaling of the divertor heat flux width in DIII-D, M.A. Makowski, C.J. Lasnier, A.W. Leonard, T.H. Osborne, M. Umansky, J.D. Elder, J.H. Nichols, P.C. Stangeby, D.A. Baver and J.R. Myra	55	Experimental studies and modeling of complete H-mode divertor detachment in ASDEX Upgrade, F. Reimold, M. Wischmeier, M. Bernert, S. Potzel, D. Coster, X. Bonnin, D. Reiter, G. Meisl, A. Kallenbach, L. Aho-Mantila, U. Stroth and ASDEX Upgrade Team	128
Plasma facing materials performance under ITER-relevant mitigated disruption photonic heat loads, N.S. Klimov, A.B. Putrik, J. Linke, R.A. Pitts, A.M. Zhitlukhin, I.B. Kuprianov, A.V. Spitsyn, O.V. Ogorodnikova, V.L. Podkovyrov, A.D. Muzichenko, B.V. Ivanov, Ya.V. Sergeecheva, I.G. Lesina, D.V. Kovalenko, V.A. Barsuk, N.A. Danilina, B.N. Bazylev and R.N. Giniyatulin	61	Interpretation of radiative divertor studies with impurity seeding in type-I ELMy H-mode plasmas in JET-ILW using EDGE2D-EIRENE, A.E. Jaervinen, M. Groth, M. Airila, P. Belo, M. Beurskens, S. Brezinsek, M. Clever, G. Corrigan, S. Devaux, P. Drewelow, T. Eich, C. Giroud, D. Harting, A. Huber, S. Jachmich, K. Lawson, B. Lipschultz, G. Maddison, C. Maggi, T. Makkonen, C. Marchetto, S. Marsen, G.F. Matthews, A.G. Meigs, D. Moulton, M.F. Stamp, S. Wiesen, M. Wischmeier and JET-EFDA collaborators	135
Quantitative modeling of fuel retention in the JET-C and JET-ILW wall configurations by WallDYN and predictions for ITER, K. Schmid, K. Krieger, S.W. Lisgo, G. Meisl, S. Brezinsek and JET EFDA Contributors	66	Runaway beam studies during disruptions at JET-ILW, C. Reux, V. Plyusnin, B. Alper, D. Alves, B. Bazylev, E. Belonohy, S. Brezinsek, J. Decker, S. Devaux, P. de Vries, A. Fil, S. Gerasimov, I. Lupelli, S. Jachmich, E.M. Khilkovitch, V. Kiptily, R. Koslowski, U. Kruezi, M. Lehnen, A. Manzanares, J. Mlynář, E. Nardon, E. Nilsson,	
Fuel retention measurements in Alcator C-Mod using accelerator-based in situ materials surveillance, Z.S. Hartwig, H.S. Barnard, B.N. Sorbom, R.C. Lanza, B. Lipschultz, P.W. Stahle and D.G. Whyte	73		
ELM induced tungsten melting and its impact on tokamak operation, J.W. Coenen, G. Arnoux, B. Bazylev, G.F. Matthews, S. Jachmich, I. Balboa, M. Clever, R. Dejarnac, I. Coffey, Y. Corre, S. Devaux, L. Frassinetti, E. Gauthier, J. Horacek, M. Knaup, M. Komm, K. Krieger, S. Marsen, A. Meigs, Ph. Mertens, R.A. Pitts, T. Pütterich, M. Rack, M. Stamp, G. Sergienko, P. Tamain, V. Thompson and JET-EFDA contributors	78		

V. Riccardo, F. Saint-Laurent, A.E. Shevelev, C. Sozzi and JET EFDA contributors	143	device, I. Sakuma, Y. Kikuchi, Y. Kitagawa, Y. Asai, K. Onishi, N. Fukumoto and M. Nagata	233	Power transmission factor through the sheath in deuterium plasmas for virgin as well as nanostructured tungsten, S. Takamura	325	Comparison on heat flux deposition between carbon and tungsten wall – Investigations on energy recycling, H. Bufferand, J. Bucalossi, G. Ciraolo, N. Fedorczak, P. Genesio, Ph. Ghendrih, J. Gunn, Y. Marandet, C. Martin, N. Mellet, E. Serre and P. Tamain	420
Wall conditioning for ITER: Current experimental and modeling activities, D. Douai, D. Kogut, T. Wauters, S. Brezinsek, G.J.M. Hagelaar, S.H. Hong, P.J. Lomas, A. Lysoivan, I. Nunes, R.A. Pitts, V. Rohde, P.C. de Vries, JET EFDA Contributors and The ASDEX-Upgrade Team	150	Tungsten recrystallization and cracking under ITER-relevant heat loads, V.P. Budaev, Yu.V. Martynenko, A.V. Karpov, N.E. Belova, A.M. Zhitlukhin, N.S. Klimov, V.L. Podkovyrov, V.A. Barsuk, A.B. Putrik, A.D. Yaroshevskaya, R.N. Giniyatulin, V.M. Safronov and L.N. Khimchenko	237	Recovery temperatures of defects in tungsten created by self-implantation, E. Markina, M. Mayer, A. Manhard and T. Schwarz-Selinger	329	Investigation of SOL parameters and divertor particle flux from electric probe measurements in KSTAR, J.G. Bak, H.S. Kim, M.K. Bae, J.W. Juhn, D.C. Seo, E.N. Bang, S.B. Shim, K.S. Chung, H.J. Lee and S.H. Hong	424
Global erosion and deposition patterns in JET with the ITER-like wall, A. Baron-Wiechec, A. Widdowson, E. Alves, C.F. Ayres, N.P. Barradas, S. Brezinsek, J.P. Coad, N. Catarino, K. Heinola, J. Likonen, G.F. Matthews, M. Mayer, P. Petersson, M. Rubel, W. van Renterghem, I. Uytendhouwen and JET-EFDA contributors	157	Cracking and damage behavior of tungsten under ELM's like energy loads using millisecond laser pulses, N. Farid, D. Zhao, H.Y. Ozerji and H. Ding	241	Systematic investigation of the formation behavior of helium bubbles in tungsten, M. Miyamoto, S. Mikami, H. Nagashima, N. Iijima, D. Nishijima, R.P. Doerner, N. Yoshida, H. Watanabe, Y. Ueda and A. Sagara	333	Observation of heat flux and plasma flow in scrape off layer in QUEST, T. Onchi, Y. Mahira, K. Nagaoka, S. Tashima, S. Banerjee, K. Mishra, H. Idei, K. Hanada, K. Nakamura, A. Fujisawa, Y. Nagashima, M. Hasegawa, K. Matsuoka, A. Kuzmin, O. Watanabe, S. Kawasaki, H. Nakashima and A. Higashijima	428
Erosion of tungsten and steel in the main chamber of ASDEX Upgrade, A. Hakola, S. Koivuoranta, J. Likonen, A. Herrmann, H. Maier, M. Mayer, R. Neu, V. Rohde and ASDEX Upgrade Team	162	Theoretical investigation of crack formation in tungsten after heat loads, A.S. Arakcheev, A. Huber, M. Wirtz, G. Sergienko, I. Stuedel, A.V. Burdakov, J.W. Coenen, A. Kreter, J. Linke, Ph. Mertens, A.A. Shoshin, B. Unterberg and A.A. Vasilyev	246	Determination of the temperature dependence of tungsten erosion, H. Maier, H. Greuner, U.v. Toussaint, M. Balden, B. Böswirth and S. Elgeti	337	Assessment of the effect of parallel temperature gradients in the JET SOL on T_e measured by divertor target Langmuir probes, I. Duran, K. Ješko, V. Fuchs, M. Groth, C. Guillemaut, J.P. Gunn, J. Horacek, R.A. Pitts, D. Tskhakaya and the JET-EFDA Contributors	432
Experimental and numerical simulations of ELM-like transient damage behaviors to different grade tungsten and tungsten alloys, X. Liu, Y. Lian, L. Chen, Z. Chen, J. Chen, X. Duan, J. Fan and J. Song	166	Measurement of transient sputtering of Mo and W by Al and B ions injected by laser ablation in PISCES-A, E.M. Hollmann, D. Nishijima and R.P. Doerner	250	Parallel investigation of double forged pure tungsten samples irradiated in three DPF devices, V.A. Gribkov, M. Paduch, E. Zielinska, T. Laas, V. Shirokova, B. Väli, J. Paju, V.N. Pimenov, E.V. Demina, S.V. Latyshev, J. Niemela, M.-L. Crespo, A. Cicuttin, A.A. Talab, A. Pokatilov and M. Parker	341	Recent sheath physics studies on DIII-D, J.G. Watkins, B. Labombard, P.C. Stangeby, C.J. Lasnier, A.G. McLean, R.E. Nygren, J.A. Boedo, A.W. Leonard and D.L. Rudakov	436
Simulation of W diaphragm efficiency for mitigation of RE beam in ITER, S. Pestchanyi, B. Bazylev and I. Landman	170	Sputtering of W and Al in D_2/O_2 plasma cleaning discharge, V.L. Bukhovets, A.E. Gorodetsky, R.Kh. Zalavutdinov, A.P. Zakharov, E.E. Mukhin and A.G. Razdobarin	255	A comparison of interatomic potentials for modeling tungsten-hydrogen-helium plasma-surface interactions, M.A. Cusentino, K.D. Hammond, F. Sefta, N. Juslin and B.D. Wirth	347	Plasma temperature rise toward the plasma-facing surface, D. Nishijima, R.P. Doerner, R.P. Seraydarian, G. De Temmerman and H.J. van der Meiden	440
Optimization of tungsten castellated structures for the ITER divertor, A. Litnovsky, M. Hellwig, D. Matveev, M. Komm, M. van den Berg, G. De Temmerman, D. Rudakov, F. Ding, G.-N. Luo, K. Krieger, K. Sugiyama, R.A. Pitts and P. Petersson	174	Erosion and deuterium retention in ion-irradiated tungsten under plasma exposure, B. Khripunov, V. Gureev, V. Koidan, S. Kornienko, S. Latushkin, V. Petrov, A. Ryazanov, E. Semenov, V. Stolyarova, L. Danelyan, V. Kulikauskas, V. Zatekin and V. Unezhev	258	Angle-resolved intensity and energy distributions of positive and negative hydrogen ions released from tungsten surface by molecular hydrogen ion impact, S. Kato, N. Tanaka, M. Sasao, M. Kisaki, K. Tsumori, M. Nishiura, Y. Matsumoto, T. Kenmotsu, M. Wada and H. Yamaoka	351	Density limit of H-mode plasmas on JET-ILW, A. Huber, S. Brezinsek, G. Sergienko, M. Groth, P.C. de Vries, L. Aho-Mantila, G. Arnoux, M. Bernert, M.N.A. Beurskens, G. Calabro, M. Clever, H.G. Esser, C. Guillemaut, S. Jachmich, A. Järvinen, Ch. Linsmeier, G.F. Matthews, A.G. Meigs, Ph. Mertens, V. Philipps, M. Stamp, M. Wischmeier, S. Wiesen and JET-EFDA contributors	445
Review of the ITER diagnostics suite for erosion, deposition, dust and tritium measurements, R. Reichle, P. Andrew, P. Bates, O. Bede, N. Casal, C.H. Choi, R. Barnsley, C. Damiani, L. Bertalot, G. Dubus, J. Ferreol, G. Jagannathan, M. Kocan, F. Leipold, S.W. Lisgo, V. Martin, J. Palmer, R. Pearce, V. Philipps, R.A. Pitts, R. Pampin, G. Passadat, A. Puiu, A. Suarez, P. Shigin, W. Shu, G. Vayakis, E. Veshchev and M. Walsh	180	Modeling of hydrogen desorption from tungsten surface, J. Guterl, R.D. Smirnov, S.I. Krashennnikov, B. Ueberuaga, A.F. Voter and D. Perez	263	First principles investigation of cluster consisting of hydrogen-helium atoms interstitially-trapped in tungsten, A. Takayama, A.M. Ito, Y. Oda and H. Nakamura	355	Investigation of the influence of divertor recycling on global plasma confinement in JET ITER-like wall, P. Tamain, E. Joffrin, H. Bufferand, A. Järvinen, S. Brezinsek, G. Ciraolo, E. Delabie, L. Frassinetti, C. Giroud, M. Groth, B. Lipschultz, P. Lomas, S. Marsen, S. Menmuir, M. Oberkofler, M. Stamp, S. Wiesen and JET EFDA contributors	450
Effects of impurity transport and melt layer motion to the tungsten wall erosion during anomaly events, K. Imano, T. Tsutsui, T.L. Lang, S. Togo and Y. Ogawa	185	Modeling of tungsten transport in the linear plasma device PSI-2 with the 3D Monte-Carlo code ERO, E. Marenkov, A. Eksaeva, D. Borodin, A. Kirschner, M. Laengner, V. Kurnaev, A. Kreter, J.W. Coenen and M. Rasinski	268	Atomistic modeling of growth and coalescence of helium nanobubbles in tungsten, R.D. Smirnov, S.I. Krashennnikov and J. Guterl	359	Molecular dynamics simulation of the formation, growth and bursting of bubbles in tungsten exposed to high fluxes of low energy deuterium, S. Liu, S. Dai, C. Sang, J. Sun, T. Stirner and D. Wang	463
Effects of high magnetic field on the melting behavior of W-1wt%La ₂ O ₃ under high heat flux, S. Qu, S. Gao, Y. Yuan, C. Li, Y. Lian, X. Liu and W. Liu	189	Erosion study of Fe-W binary mixed layer prepared as model system for RAFM steel, K. Sugiyama, J. Roth, V.Kh. Alimov, K. Schmid, M. Balden, S. Elgeti, F. Koch, T. Höschen, M.J. Baldwin, R.P. Doerner, H. Maier and W. Jacob	272	Molecular dynamic simulation of the formation, growth and bursting of bubbles in tungsten exposed to high fluxes of low energy deuterium, S. Liu, S. Dai, C. Sang, J. Sun, T. Stirner and D. Wang	363	Simulation of hydrogen bubble growth in tungsten by a hybrid model, C. Sang, J. Sun, X. Bonnin, L. Wang and D. Wang	467
Evolution of transiently melt damaged tungsten under ITER-relevant divertor plasma heat loading, S. Bardin, T.W. Morgan, X. Glad, R.A. Pitts and G. De Temmerman	193	OEDGE modeling of outer wall erosion in NSTX and the effect of changes in neutral pressure, J.H. Nichols, M.A. Jaworski, R. Kaita, T. Abrams, C.H. Skinner and D.P. Stotler	276	Modelling of surface evolution of rough surface on divertor target in fusion devices, S. Dai, S. Liu, J. Sun, A. Kirschner, G. Kawamura, D. Tskhakaya, R. Ding, G. Luo and D. Wang	367	Modelling of surface evolution of rough surface on divertor target in fusion devices, S. Dai, S. Liu, J. Sun, A. Kirschner, G. Kawamura, D. Tskhakaya, R. Ding, G. Luo and D. Wang	455
Effect of high-flux H/He plasma exposure on tungsten damage due to transient heat loads, G. De Temmerman, T.W. Morgan, G.G. van Eden, T. de Kruijff, M. Wirtz, J. Matejicek, T. Chraska, R.A. Pitts and G.M. Wright	198	Tracer techniques for the assessment of material migration and surface modification of plasma-facing components, M. Rubel, A. Weckmann, P. Ström, P. Petersson, A. Garcia-Carrasco, S. Brezinsek, J. Coenen, A. Kreter, S. Möller, P. Wienhold, T. Wauters and E. Fortuna-Zalesna	280	Molecular dynamic simulation of tungsten ablation under transient high heat flux, S. Yan, Y. Zhu, J. Xue, J. Zhang, M. Qu and X. Le	372	Influence of toroidal field ripple and resonant magnetic perturbations on global ¹³ C transport in ASDEX Upgrade, J. Miettunen, M.I. Airila, M. Groth, V. Lindholm, T. Makkonen, S. Äkäslompolo and the ASDEX Upgrade Team	459
ITER-W monoblocks under high pulse number transient heat loads at high temperature, Th. Loewenhoff, J. Linke, G. Pintsuk, R.A. Pitts and B. Ricciardi	202	Nanostructure growth by helium plasma irradiation to tungsten in sputtering regime, Y. Noiri, S. Kajita and N. Ohno	285	Understanding narrow SOL power flux component in COMPASS limiter plasmas by use of Langmuir probes, R. Dejarnac, P.C. Stangeby, R.J. Goldston, E. Gauthier, J. Horacek, M. Hron, M. Kocan, M. Komm, R. Panek, R.A. Pitts and P. Vondracek	377	Influence of external resonant magnetic perturbation field on edge plasma of small tokamak HYBTOK-II, Y. Hayashi, Y. Suzuki, N. Ohno, M. Okamoto, Y. Kikuchi, S. Sakakibara, K. Watanabe and Y. Takamura	463
Surface modifications on toughened, fine-grained, recrystallized tungsten with repetitive ELM-like pulsed plasma irradiation, Y. Kikuchi, I. Sakuma, Y. Kitagawa, Y. Asai, K. Onishi, N. Fukumoto, M. Nagata, Y. Ueda and H. Kurishita	206	Dynamic measurement of the helium concentration of evolving tungsten nanostructures using Elastic Recoil Detection during plasma exposure, K.B. Woller, D.G. Whyte and G.M. Wright	289	Narrow heat flux channels in the COMPASS limiter scrape-off layer, J. Horacek, P. Vondracek, R. Panek, R. Dejarnac, M. Komm, R.A. Pitts, M. Kocan, R.J. Goldston, P.C. Stangeby, E. Gauthier, P. Hacek, J. Havlicek, M. Hron, M. Imrisek, F. Janky and J. Seidl	381	Edge plasma physics modifications due to magnetic ripple in RFX-mod, P. Scarin, M. Agostini, L. Carraro, R. Cavazzana, G. Ciaccio, G. De Masi, G. Spizzo, M. Spolaore and N. Vianello	467
Damage of target edges in brush-like geometry in the course of ELM-like plasma pulses in QSPA Kh-50, V.A. Makhilaj, I.E. Garkusha, N.N. Aksenov, B. Bazylev, O.V. Byrka, V.V. Chebotarev, I. Landman, S.S. Herashchenko and V.V. Stalstov	210	Characterizing the recovery of a solid surface after tungsten nano-tendrils formation, G.M. Wright, G.G. van Eden, L.A. Kesler, G. De Temmerman, D.G. Whyte and K.B. Woller	294	Power deposition on the DIII-D inner wall limiter, P.C. Stangeby, C.K. Tsui, C.J. Lasnier, J.A. Boedo, J.D. Elder, M. Kocan, A.W. Leonard, A.G. McLean, R.A. Pitts and D.L. Rudakov	389	Divertor plasma conditions and neutral dynamics in horizontal and vertical divertor configurations in JET-ILW low confinement mode plasmas, M. Groth, S. Brezinsek, P. Belo, M. Brix, G. Calabro, A. Chankin, M. Clever, J.W. Coenen, G. Corrigan, P. Drewelow, C. Guillemaut, D. Harting, A. Huber, S. Jachmich, A. Järvinen, U. Kruezi, K.D. Lawson, M. Lehnen, C.F. Maggi, C. Marchetto, S. Marsen, F. Maviglia, A.G. Meigs, D. Moulton, C. Silva, M.F. Stamp, S. Wiesen and The EFDA-JET Contributors	471
Recrystallization of bulk and plasma-coated tungsten with accumulated thermal energy relevant to Type-I ELM in ITER H-mode operation, H.-S. Kim, S.-T. Lim, Y. Jin, J.Y. Lee, J.-M. Song and G.-H. Kim	215	The occurrence and damage of unipolar arcing on fuzzy tungsten, D.U.B. Aussems, D. Nishijima, C. Brandt, H.J. van der Meiden, M. Vilémová, J. Matějček, G. De Temmerman, R.P. Doerner and N.J. Lopes Cardozo	303	Evaluation of first wall heat fluxes due to magnetic perturbations for a range of ITER scenarios, P. Cahyna, L. Kripner, A. Loarte, G. Huijsmans, M. Peterka and R. Panek	401	Momentum balance for impurities in SOLPS transport code, V. Rozhansky, E. Sytova, I. Senichenkov, I. Veselova, S. Voskoboynikov and D. Coster	477
FEM study of recrystallized tungsten under ELM-like heat loads, J. Du, Y. Yuan, M. Wirtz, J. Linke, W. Liu and H. Greuner	219	Deuterium-induced nanostructure formation on tungsten exposed to high-flux plasma, H.Y. Xu, G. De Temmerman, G.-N. Luo, Y.Z. Jia, Y. Yuan, B.Q. Fu, A. Godfrey and W. Liu	308	MHD stability of the ITER pedestal and SOL plasma and its influence on the heat flux width, A. Loarte, F. Liu, G.T.A. Huijsmans, A.S. Kukushkin and R.A. Pitts	406	The new SOLPS-ITER code package, S. Wiesen, D. Reiter, V. Kotov, M. Baelmans, W. Dekeyser, A.S. Kukushkin, S.W. Lisgo, R.A. Pitts, V. Rozhansky, G. Saibene, I. Veselova and S. Voskoboynikov	480
Surface modifications of W divertor components for EAST during exposure to high heat loads with He, C. Li, H. Greuner, Y. Yuan, S.X. Zhao, G.N. Luo, B. Böswirth, B.Q. Fu, Y.Z. Jia, X. Liu and W. Liu	223	Nanostructures and pinholes on W surfaces exposed to high flux D plasma at high temperatures, Y.Z. Jia, W. Liu, B. Xu, G.-N. Luo, C. Li, B.Q. Fu and G. De Temmerman	312	The combined effects of magnetic asymmetry, assembly and manufacturing tolerances on the plasma heat load to the ITER first wall, R. Mitteau, P. Stangeby, H. Labidi, R. Bruno and R. Raffray	411	Effects of drifts and ballooning instability on the divertor in-out asymmetry in EAST tokamak, H. Du, C. Sang, L. Wang, X. Bonnin, H.Y. Guo, J. Sun and D. Wang	485
Investigation of plasma-surface interaction at plasma beam facilities, V. Kurnaev, I. Vizgalov, K. Gutorov, T. Tulenbergenov, I. Sokolov, A. Kolodeshnikov, V. Ignashev, V. Zuev, I. Bogomolova and N. Klimov	228	Temperature impact on W surface exposed to He plasma in LHD and its consequences for the material properties, E. Bernard, R. Sakamoto, N. Yoshida and H. Yamada	316	Thermal analysis of an exposed tungsten edge in the JET divertor, G. Arnoux, J. Coenen, B. Bazylev, Y. Corre, G.F. Matthews, I. Balboa, M. Clever, R. Dejarnac, S. Devaux, T. Eich, E. Gauthier, L. Frassinetti, J. Horacek, S. Jachmich, D. Kinna, S. Marsen, Ph. Mertens, R.A. Pitts, M. Rack, G. Sergienko, B. Sieglin, M. Stamp, V. Thompson and JET EFDA Contributors	415	Investigation of drift velocity effects on the EDGE and SOL transport, R. Leybros, H. Bufferand, G. Ciraolo, N. Fedorczak, Ph. Ghendrih, P. Hennequin, Y. Marandet, E. Serre, F. Schwander and P. Tamain	489
Experimental investigation of vapor shielding effects induced by ELM-like pulsed plasma loads using the double plasma gun		Influence of tungsten microstructure and ion flux on deuterium plasma-induced surface modifications and deuterium retention, L. Buzi, G. De Temmerman, B. Unterberg, M. Reinhart, T. Dittmar, D. Matveev, Ch. Linsmeier, U. Breuer, A. Kreter and G. Van Oost	320			Intra-ELM phase modelling of a JET ITER-like wall H-mode discharge with EDGE2D-EIRENE, D.M. Harting, S. Wiesen, M. Groth, S. Brezinsek, G. Corrigan, G. Arnoux, P. Boerner, S. Devaux,	

J. Flanagan, A. Järvinen, S. Marsen, D. Reiter and JET-EFDA contributors	493	Improved EDGE2D-EIRENE simulations of JET ITER-like wall L-mode discharges utilising poloidal VUV/visible spectral emission profiles, K.D. Lawson, M. Groth, P. Belo, S. Brezinsek, G. Corrigan, A. Czarnecka, E. Delabie, P. Drewelow, D. Harting, I. Książek, C.F. Maggi, C. Marchetto, A.G. Meigs, S. Menmuir, M.F. Stamp, S. Wiesen and JET-EFDA contributors	582	Ammonia formation in N ₂ /H ₂ plasmas on ITER-relevant plasma facing materials: Surface temperature and N ₂ plasma content effects, A. de Castro, D. Alegre and F.L. Tabarés	676	Filamentary transport in the private flux region in MAST, J.R. Harrison, G.M. Fishpool and B.D.udson	757
On the locality of parallel transport of heat carrying electrons in the SOL, A.V. Chankin and D.P. Coster	498	Characteristics of divertor detachment for ITER conditions, A.S. Kukushkin, H.D. Pacher and R.A. Pitts	586	Ammonia formation and W coatings interaction with deuterium/nitrogen plasmas in the linear device GyM, L. Laguardia, R. Caniello, A. Cremona, D. Dellasega, F. Dell'Era, F. Ghezzi, G. Gittini, G. Granucci, V. Mellera, D. Minelli, F. Pallotta, M. Passoni, D. Ricci and E. Vassallo	680	Multi-pin Langmuir probe measurement for identification of blob propagation characteristics in the Large Helical Device, H. Tanaka, S. Masuzaki, N. Ohno, T. Morisaki, Y. Tsuji and LHD Experiment Group	761
SOL-divertor plasma simulations introducing anisotropic temperature with virtual divertor model, S. Togo, T. Takizuka, M. Nakamura, K. Hoshino and Y. Ogawa	502	Impurity seeding in ITER DT plasmas in a carbon-free environment, H.D. Pacher, A.S. Kukushkin, G.W. Pacher, V. Kotov, R.A. Pitts and D. Reiter	591	Mass spectrometry analysis of the impurity content in N ₂ seeded discharges in JET-ILW, A. Drenik, M. Oberkofler, D. Alegre, U. Kruezi, S. Brezinsek, M. Mozetic, I. Nunes, M. Wischmeier, C. Giroud, G. Maddison, C. Reux and JET EFDA Contributors	684	Electromagnetic effects on plasma blob-filament transport, W. Lee, J.R. Angus, M.V. Umansky and S.I. Krasheninnikov	765
Modeling of tokamak divertor plasma for weakly collisional parallel electron transport, M.V. Umansky, A.M. Dimits, I. Joseph, J.T. Omotani and T.D. Rognlien	506	Mitigation of the divertor heat load in DEMO reactor by impurity seeding, I. Ivanova-Stanik and R. Zagórski	596	Nitrogen removal from plasma-facing components by ion cyclotron wall conditioning in TEXTOR, A.G. Carrasco, T. Wauters, P. Petersson, A. Drenik, M. Rubel, K. Crombé, D. Douai, E. Fortuna, D. Kogut, A. Kreter, A. Lysoivan, S. Möller, M. Pisarek and M. Vervier	688	Non-local parallel transport in BOUT++, J.T. Omotani, B.D.udson, E. Havlíčková and M. Umansky	769
Transport simulations of linear plasma generators with the B2.5-Eirene and EMC3-Eirene codes, J. Rapp, L.W. Owen, X. Bonnin, J.F. Caneses, J.M. Canik, C. Corr and J.D. Lore	510	Trends of W behavior in ICRF assisted discharges in ASDEX Upgrade, A. Czarnecka, V. Bobkov, R. Dux, T. Pütterich, M. Sertoli and The ASDEX Upgrade Team	601	Suppression of hydrogenated carbon film deposition and hydrogen isotope retention by nitrogen addition into cold remote H/D and CH ₄ mixture plasmas, K. Iida, M. Notani, Y. Uesugi, Y. Tanaka and T. Ishijima	693	Materials migration in JET with ITER-like wall traced with a ¹⁰ Be isotopic marker, I. Bykov, H. Bergsäter, G. Possnert, K. Heinola, J. Miettunen, M. Groth, P. Petersson, A. Widdowson, J. Likonen and JET EFDA contributors	773
EMC3-EIRENE modeling of toroidally-localized divertor gas injection experiments on Alcator C-Mod, J.D. Lore, M.L. Reinke, B. LaBombard, B. Lipschultz, R.M. Churchill, R.A. Pitts and Y. Feng	515	Control of high-Z PFC erosion by local gas injection in DIII-D, D.L. Rudakov, P.C. Stangeby, C.P.C. Wong, A.G. McLean, W.R. Wampler, J.G. Watkins, J.A. Boedo, A. Briesemeister, D.A. Buchenauer, C.P. Chrobak, J.D. Elder, M.E. Fenstermacher, H.Y. Guo, C.J. Lasnier, A.W. Leonard, R. Maingi and R.A. Moyer	605	Energy deposition onto HL-2A divertor plates in ELMy H-mode discharges using infrared thermography, J.M. Gao, W. Li, Y. Liu, X.Q. Ji, J. Cheng, Y.B. Dong, C.Y. Chen, B.B. Feng, J. Lu, P. Yi, Q.W. Yang and HL-2A Team	697	The relationship between gross and net erosion of beryllium at elevated temperature, R.P. Doerner, I. Jepu, D. Nishijima, E. Safi, L. Bukonte, A. Lasa, K. Nordlund and T. Schwarz-Selinger	777
Compatibility of detached divertor operation with robust edge pedestal performance, A.W. Leonard, M.A. Makowski, A.G. McLean, T.H. Osborne and P.B. Snyder	519	Coupled core-SOL modelling of W contamination in H-mode JET plasmas with ITER-like wall, V. Parail, G. Corrigan, P. Da Silva Aresta Belo, E. De La Luna, D. Harting, F. Koechl, T. Koskela, A. Meigs, E. Militello-Asp, M. Romanelli, M. Tsalas and JET-EFDA contributors	611	Impact of ELM filaments on divertor heat flux dynamics in NSTX, J.-W. Ahn, R. Maingi, J.M. Canik, K.F. Gan, T.K. Gray and A.G. McLean	701	Erosion of beryllium under ITER – Relevant transient plasma loads, I.B. Kupriyanov, G.N. Nikolaev, L.A. Kurbatova, N.P. Porezanov, V.L. Podkovyrov, A.D. Muzichenko, A.M. Zhilukhin, A.A. Gervash and V.M. Safronov	781
Impurity ion flow and temperature measured in a detached divertor with externally applied non-axisymmetric fields on DIII-D, A.R. Briesemeister, R.C. Isler, S.L. Allen, J.-W. Ahn, A.G. McLean, E.A. Unterberg, D.L. Hillis, M.E. Fenstermacher and W.H. Meyer	524	SOLPS modelling of W arising from repetitive mitigated ELMs in ITER, D.P. Coster, A.V. Chankin, H.-J. Klingenshirn, R. Dux, E. Fable, X. Bonnin, A. Kukushkin and A. Loarte	615	Dynamic plasma-wall modeling of ELMy H-mode with UEDGE-MB-W, A.Yu. Pigarov, S.I. Krasheninnikov, T.D. Rognlien, C.J. Lasnier and E. Unterberg	705	Material deposition on inner divertor quartz-micro balances during ITER-like wall operation in JET, H.G. Esser, V. Philipps, M. Freisinger, A. Widdowson, K. Heinola, A. Kirschner, S. Möller, P. Petersson, S. Brezinsek, A. Huber, G.F. Matthews, M. Rubel, G. Sergienko and JET-EFDA contributor	796
Effects of magnetic configuration on divertor power and particle deposition for long pulse operation in EAST, H.Y. Guo, T.Y. Xia, S.C. Liu, H.Q. Wang, L. Wang and X.Q. Xu	528	Modelling of tungsten re-deposition coefficient, D. Tskhakaya, M. Groth and JET EFDA contributors	620	Modelling ELM heat flux deposition on the ITER main chamber wall, M. Kočan, R.A. Pitts, S.W. Lisgo, A. Loarte, J.P. Gunn and V. Fuchs	709	Preliminary Monte Carlo simulation of beryllium migration during JET ITER-like wall divertor operation, M.I. Airila, A. Järvinen, M. Groth, P. Belo, S. Wiesen, S. Brezinsek, K. Lawson, D. Borodin, A. Kirschner, J.P. Coad, K. Heinola, J. Likonen, M. Rubel, A. Widdowson and JET-EFDA contributors	800
Electron pressure balance in the SOL through the transition to detachment, A.G. McLean, A.W. Leonard, M.A. Makowski, M. Groth, S.L. Allen, J.A. Boedo, B.D. Bray, A.R. Briesemeister, T.N. Carlstrom, D. Eldon, M.E. Fenstermacher, D.N. Hill, C.J. Lasnier, C. Liu, T.H. Osborne, T.W. Petrie, V.A. Soukhanovskii, P.C. Stangeby, C. Tsui, E.A. Unterberg and J.G. Watkins	533	Assessment of tungsten sources in the edge plasma of WEST, Y. Marandet, H. Bufferand, J. Bucalossi, G. Ciraolo, S.W. Lisgo and E. Tsitrone	624	ELM mitigation by means of supersonic molecular beam and pellet injection on the EAST superconducting tokamak, J.S. Hu, Z. Sun, C.Z. Li, X.W. Zhen, J.G. Li, H.Y. Guo, J.H. Li, L. Wang, K.F. Gan, Y. Chen, J. Ren, G.Z. Zuo, X.J. Yao, L.Q. Hu, X.Z. Gong, B.N. Wan, X.L. Zou, D.K. Mansfield, Y.F. Liang, I. Vinyar and the EAST team	714	Atomistic simulations of the effect of reactor-relevant parameters on be sputtering, E. Safi, C. Björkas, A. Lasa, K. Nordlund, I. Sukuba and M. Probst	805
Progress of divertor simulation research toward the realization of detached plasma using a large tandem mirror device, Y. Nakashima, H. Takeda, K. Ichimura, K. Hosoi, K. Oki, M. Sakamoto, M. Hirata, M. Ichimura, R. Ikezoe, T. Imai, M. Iwamoto, Y. Hosoda, I. Katanuma, T. Kariya, S. Kigure, J. Kohagura, R. Minami, T. Numakura, S. Takahashi, M. Yoshikawa, N. Asakura, M. Fukumoto, A. Hatayama, Y. Hirooka, S. Kado, H. Kubo, S. Masuzaki, H. Matsuura, S. Nagata, N. Nishino, N. Ohno, A. Sagara, T. Shikama, M. Shoji, A. Toneygawa and Y. Ueda	537	Impact of localized gas injection on ICRF coupling and SOL parameters in JET-ILW H-mode plasmas, E. Lerche, M. Goniche, P. Jacquet, D. Van Eester, V. Bobkov, L. Colas, A. Czarnecka, S. Brezinsek, M. Brix, K. Crombe, M. Graham, M. Groth, I. Monakhov, T. Mathurin, G. Matthews, L. Meneses, C. Noble, V. Petrzilka, F. Rimini, A. Shaw and JET-EFDA contributors	634	ELM mitigation via rotating resonant magnetic perturbations on MAST, A.J. Thornton, A. Kirk, P. Cahyna, I.T. Chapman, G. Fishpool, J.R. Harrison, Y.Q. Liu, L. Kripner, M. Peterka and The MAST Team	718	Measurements of gross erosion of Al in the DIII-D divertor, C. Chrobak, P.C. Stangeby, A.W. Leonard, D.L. Rudakov, C.P.C. Wong, A.G. McLean, G.M. Wright, D.A. Buchenauer, J.G. Watkins, W.R. Wampler, J.D. Elder, R.P. Doerner, D. Nishijima and G.R. Tynan	810
Formation of the high density front in the inner far SOL at ASDEX Upgrade and JET, S. Potzel, M. Wischmeier, M. Bernert, R. Dux, F. Reimold, A. Scarabosio, S. Brezinsek, M. Clever, A. Huber, A. Meigs, M. Stamp, the ASDEX Upgrade Team and JET-EFDA contributors	541	Radiated power distributions in impurity-seeded plasmas in LHD, T. Morisaki, K. Oyama, N. Tamura, S. Masuzaki, T. Akiyama, G. Motojima, J. Miyazawa, B.J. Peterson, N. Ohno, H. Yamada and LHD Experiment Group	640	Study of the radiated energy loss during massive gas injection mitigated disruptions on EAST, Y.M. Duan, Z.K. Hao, L.Q. Hu, L. Wang, P. Xu, L.Q. Xu, H.D. Zhuang and EAST Team	723	Co-deposited layers in the divertor region of JET-ILW, P. Petersson, M. Rubel, H.G. Esser, J. Likonen, S. Koivuranta, A. Widdowson and JET-EFDA contributors	814
Model-based radiation scalings for the ITER-like divertors of JET and ASDEX Upgrade, L. Aho-Mantila, X. Bonnin, D.P. Coster, C. Lowry, M. Wischmeier, S. Brezinsek, G. Federici, the ASDEX Upgrade Team and the JET-EFDA Contributors	546	Effect of neutral hydrogen on edge impurity behavior in stochastic magnetic field layer of Large Helical Device, S. Morita, M. Kobayashi, T. Oishi, H.M. Zhang, M. Goto, Z.Y. Cui, C.F. Dong, L.Q. Hu, X.L. Huang, G. Kawamura, S. Masuzaki, I. Murakami and E.H. Wang	644	Melt layer formation in stainless steel under transient thermal loads, I. Steudel, N.S. Klimov, J. Linke, Th. Loewenhoff, G. Pintsuk, R.A. Pitts and M. Wirtz	731	Analysis of rotating collectors from the private region of JET with carbon wall and metallic ITER-like wall, J. Beal, A. Widdowson, K. Heinola, A. Baron-Wiechec, K.J. Gibson, J.P. Coad, E. Alves, B. Lipschultz, A. Kirschner, G.F. Matthews, S. Brezinsek and JET-EFDA contributors	818
Evolution of radiation profiles during detached plasmas and radiative collapse in LHD, S.N. Pandya, B.J. Peterson, M. Kobayashi, K. Mukai, R. Sano, H. Tanaka, S. Masuzaki, J. Miyazawa, T. Akiyama, G. Motojima and N. Ohno	551	Influence of seeding and SOL transport on plasma parameters in JET ITER-like wall H-mode discharges, R. Zagórski, I. Ivanova-Stanik, A. Czarnecka, G. Telesca, S. Brezinsek and JET EFDA contributors	649	Localized Scrape-Off Layer density modifications by Ion Cyclotron near fields in JET and ASDEX-Upgrade L-mode plasmas, L. Colas, Ph. Jacquet, D. Van Eester, V. Bobkov, M. Brix, L. Meneses, P. Tamain, S. Marsen, C. Silva, D. Carralero, M. Kočan, H.-W. Müller, K. Crombé, A. Křivská, M. Goniche, E. Lerche, F.G. Rimini, JET-EFDA Contributors and ASDEX-Upgrade team	735	Hydrocarbon film deposition inside cavity samples in remote areas of the JET divertor during the 1999–2001 and 2005–2009 campaigns, S. Krat, Yu. Gasparyan, A. Pisarev, M. Mayer, U. von Toussaint, P. Coad, A. Widdowson and JET-EFDA contributors	822
Comparison of Ne and Ar seeded radiative divertor plasmas in JT-60U, T. Nakano and The JT-60 Team	555	Impact of the plasma-wall contact position on edge turbulent transport and poloidal asymmetries in 3D global turbulence simulations, C. Colin, P. Tamain, F. Schwander, E. Serre, H. Bufferand, G. Ciraolo, N. Fedorczak and Ph. Ghendrih	654	Far scrape-off layer particle and heat fluxes in high density – High power scenarios, H.W. Müller, M. Bernert, D. Carralero, A. Kallenbach, B. Kurzan, A. Scarabosio, B. Sieglin, L. Tophøj, N. Vianello, E. Wolfrum and ASDEX Upgrade Team	739	Modelling the erosion/deposition pattern of the Tore Supra Toroidal Pumped Limiter, S. Panayotis, B. Pégourié, D. Borodin, A. Kirschner, J. Gunn, Y. Marandet and N. Mellet	827
Vacuum ultraviolet spectroscopy in detached plasmas with impurity gas seeding in LHD, C. Suzuki, I. Murakami, T. Akiyama, S. Masuzaki, H. Funaba, M. Yoshinuma and LHD Experiment Group	561	Scrape-Off Layer impurity transport including the effects of turbulence on ionization/recombination terms, F. Guzmán, Y. Marandet, P. Tamain, D. Moulton, H. Bufferand, G. Ciraolo, R. Guirlet and Ph. Ghendrih	659	EMC3-Eirene simulations of particle- and energy fluxes to main chamber- and divertor plasma facing components in ASDEX Upgrade compared to experiments, T. Lunt, D. Carralero, Y. Feng, G. Birkenmeier, H.W. Müller, S. Müller, M. Wischmeier and the ASDEX Upgrade team	744	Heat flux distribution and gyro-radius smoothing effect on misaligned CFC tile in the Tore Supra tokamak, Y. Corre, R. Dejarnac, J.-L. Gardarein, J. Gaspar, F. Escourbiac, E. Gauthier, J.-P. Gunn, M. Komm, M. Lipa, T. Loarer, M. Missirlian and F. Rigollet	832
OEDGE modeling of DIII-D density scan discharges leading to detachment, J.D. Elder, P.C. Stangeby, B.D. Bray, N. Brooks, A.W. Leonard, A.G. McLean, E.A. Unterberg and J.G. Watkins	565	Modeling of aluminum impurity entrainment in the PISCES-A He ⁺ plasma, R.J. Hajjar, E.M. Hollmann, S.I. Krasheninnikov and R.P. Doerner	664	Final case for a stainless steel diagnostic first wall on ITER, R.A. Pitts, B. Bazylev, J. Linke, I. Landman, M. Lehnen, D. Loesser, Th. Loewenhoff, M. Merola, R. Roccella, G. Saibene, M. Smith and V.S. Udintsev	748	Impact of W events and dust on JET-ILW operation, M. Sertoli, J.C. Flanagan, M. Bacharis, O. Kardaun, A. Jarvinen, G.F. Matthews, S. Brezinsek, D. Harting, A. Cackett, E. Hodille, I.H. Coffey, E. Lazzaro, T. Pütterich and JET-EFDA contributors	837
Modeling of detachment experiments at DIII-D, J.M. Canik, A.R. Briesemeister, C.J. Lasnier, A.W. Leonard, J.D. Lore, A.G. McLean and J.G. Watkins	569	Nitrogen retention in ASDEX Upgrade, G. Meisl, K. Schmid, M. Oberkofler, K. Krieger, S.W. Lisgo, L. Aho-Mantila, F. Reimold and ASDEX Upgrade Team	668	Investigation of SOL plasma interaction with graphite PFC, S.-T. Lim, H.-S. Kim, Y. Jin, J.Y. Lee, J.-M. Song and G.-H. Kim	753	Measurement of dust conversion factor for the JET carbon divertor phases, J. Likonen, J.P. Coad, A. Hakola, J. Karhunen, S. Koivuranta, R. Pitts, A.M. Widdowson and JET contributors	842
The influence of the radial particle transport on the divertor plasma detachment, K. Hoshino, K. Shimizu, T. Takizuka, N. Asakura and T. Nakano	573	Ammonia production in nitrogen seeded plasma discharges in ASDEX Upgrade, V. Rohde, M. Oberkofler and the ASDEX Upgrade Team	672				
Numerical simulations of JET discharges with the ITER-like wall for different nitrogen seeding scenarios, G. Telesca, I. Ivanova-Stanik, R. Zagórski, S. Brezinsek, A. Czarnecka, P. Drewelow, C. Giroud, S. Marsen, M. Wischmeier and JET EFDA Contributors	577						

Dust characterization in FTU tokamak, <i>M. De Angeli, G. Maddaluno, L. Laguardia, D. Ripamonti, E. Perelli Cippo, M.L. Apicella, C. Conti, G. Giacomi and G. Grosso</i>	847	Effect of steady magnetic field on laser-induced breakdown spectroscopic characterization of EAST-like wall materials, <i>R. Hai, P. Liu, D. Wu, Q. Xiao, L. Sun and H. Ding</i>	927	Influence of plasma impurities on the deuterium retention in tungsten exposed in the linear plasma generator PSI-2, <i>M. Reinhart, A. Kreter, L. Buzi, M. Rasinski, A. Pospieszczyk, B. Unterberg and Ch. Linsmeier</i>	1021	<i>E. Belonohy, T. Blackman, V. Bobkov, K. Crombé, A. Drenik, M. Graham, E. Joffrin, E. Lerche, T. Loarer, P.L. Lomas, M.-L. Mayoral, I. Monakhov, M. Oberkofler, V. Philipps, V. Plyusnin, G. Sergienko, D. Van Eester and JET EFDA Contributors</i>	1104
Quantitative measurement of in-vessel dust velocity and its correlation with toroidal rotation of plasmas, <i>S.-H. Hong, K.-R. Kim, W.-H. Ko and Y. Nam</i>	851	Applicability of LIBS for <i>in situ</i> monitoring of deposition and retention on the ITER-like wall of JET – Comparison to SIMS, <i>J. Karhunen, A. Hakola, J. Likonen, A. Lissovski, M. Laan, P. Paris and JET EFDA Contributors</i>	931	Effect of neon plasma pre-irradiation on surface morphology and deuterium retention of tungsten, <i>L. Cheng, G. De Temmerman, P.A. Zeijlmans van Emmichoven, G. Ji, H.B. Zhou, B. Wang, Y. Yuan, Y. Zhang and G.H. Lu</i>	1025	Fundamental processes of fuel removal by cyclotron frequency range plasmas and integral scenario for fusion application studied with carbon co-deposits, <i>S. Möller, T. Wauters, A. Kreter, P. Petersson and A.G. Carrasco</i>	1109
Influence of large dust particles on plasma performance in the HL-2A tokamak, <i>Z.H. Huang, L.W. Yan, Z. Feng, J. Cheng, Y. Tomita, L. Liu, J.M. Gao, W.L. Zhong, M. Jiang, Q.W. Yang, Y. Xu, X.R. Duan and the HL-2A team</i>	856	Influence of stray light for divertor spectroscopy in ITER, <i>S. Kajita, E. Veshchev, S. Lisgo, R. Barnsley, P. Morgan, M. Walsh, H. Ogawa, T. Sugie and K. Itami</i>	936	Retention behaviors of tritium loaded near the surface region of metals by gas absorption and plasma implantation, <i>T. Otsuka, Y. Ogawa, M. Higaki and Y. Ishitani</i>	1029	Modelling the ITER glow discharge plasma, <i>D. Kogut, D. Douai, G. Hagelaar and R.A. Pitts</i>	1113
Analysis of the three-dimensional trajectories of dusts observed with a stereoscopic fast framing camera in the Large Helical Device, <i>M. Shoji, S. Masuzaki, Y. Tanaka, A.Yu. Pigarov, R.D. Smirnov, G. Kawamura, Y. Uesugi, H. Yamada and The LHD Experiment Group</i>	861	Plasma cleaning of ITER First Mirrors in magnetic field, <i>L. Moser, R. Steiner, F. Leipold, R. Reichle, L. Marot and E. Meyer</i>	940	Temperature dependence of deuterium retention in tungsten deposits by deuterium ion irradiation, <i>K. Katayama, K. Uehara, H. Date, S. Fukada and H. Watanabe</i>	1033	Plasma isotopic change over experiments in JET under Carbon and ITER-like Wall conditions, <i>T. Loarer, S. Brezinsek, V. Philipps, S. Romanelli-Gruenhagen, D. Alves, I. Carvalho, D. Douai, H.G. Esser, R. Felton, D. Frigione, U. Kruezi, C. Reux, R. Smith, M.F. Stamp, S. Tartanian and JET-EFDA contributors</i>	1117
Real-time mass measurement of dust particles deposited on vessel wall in a divertor simulator using quartz crystal microbalances, <i>M. Tateishi, K. Koga, R. Katayama, D. Yamashita, K. Kamataki, H. Seo, N. Itagaki, M. Shiratani, N. Ashikawa, S. Masuzaki, K. Nishimura, A. Sagara and the LHD Experiment Group</i>	865	Laser cleaning of diagnostic mirrors from tokamak-like carbon contaminants, <i>A. Maffini, A. Uccello, D. Dellasega, V. Russo, S. Perissinotto and M. Passoni</i>	944	Surface morphology changes and deuterium retention in Toughened, Fine-grained Recrystallized Tungsten under high-flux irradiation conditions, <i>M. Oya, H.T. Lee, Y. Ueda, H. Kurishita, M. Oyaidzu, T. Hayashi, N. Yoshida, T.W. Morgan and G. De Temmerman</i>	1037	Influence of helium on hydrogen isotope exchange in tungsten at sequential exposures to deuterium and helium–protium plasmas, <i>N.P. Bobyr, V.Kh. Alimov, B.I. Khripunov, A.V. Spitsyn, M. Mayer, Y. Hatano, A.V. Golubeva and V.B. Petrov</i>	1122
On ablation of large Tungsten dust grains in edge plasma of fusion devices, <i>S.I. Krashennnikov and E.D. Marenkov</i>	869	Experimental studies of first mirror exposure and surface recovery on EAST, <i>R. Yan, R. Ding, J.L. Chen and L.W. Chen</i>	948	Thermal annealing and exposure to divertor-like deuterium plasma of tailored tungsten oxide coatings, <i>A. Pezzoli, D. Dellasega, V. Russo, A. Gallo, P.A. Zeijlmans van Emmichoven and M. Passoni</i>	1041	Hydrogen–deuterium exchange on plasma-exposed W and SS surface, <i>I. Takagi, S. Nomura, T. Minamimoto, M. Akiyoshi, T. Kobayashi and T. Sasaki</i>	1125
Characterization of dust particles produced in an all-tungsten wall tokamak and potentially mobilized by airflow, <i>A. Rondeau, S. Peillon, A. Roynette, J.-C. Sabroux, T. Gelain, F. Gensdarmes, V. Rohde, C. Grisolia and E. Chassefière</i>	873	Ellipsometric and electron spectroscopic study of degradation of optical properties in Mo mirror irradiated with deuterium and/or helium ions, <i>K. Ono, M. Miyamoto, S. Hasuike, T. Nakano and H. Kurata</i>	952	Deuterium retention in TiC and TaC doped tungsten at high temperatures, <i>M. Zibrov, M. Mayer, L. Gao, S. Elgeti, H. Kurishita, Yu. Gasparyan and A. Pisarev</i>	1045	Development of an analytical diffusion model for modeling hydrogen isotope exchange, <i>J.L. Barton, Y.Q. Wang, R.P. Doerner and G.R. Tynan</i>	1129
Elastic–plastic adhesive impacts of tungsten dust with metal surfaces in plasma environments, <i>S. Ratynskaia, P. Tolias, A. Shalpegin, L. Vignitchouk, M. De Angeli, I. Bykov, K. Bystrov, S. Bardin, F. Brochard, D. Ripamonti, N. den Harder and G. De Temmerman</i>	877	Microscopically nonuniform deposition and deuterium retention in the divertor in JET with ITER-like wall, <i>H. Bergsaker, I. Bykov, P. Petersson, G. Possnert, J. Likonen, S. Koivuranta, J.P. Coad, W. Van Renterghem, I. Uytendhouwen, A.M. Widdowson and JET EFDA Contributors</i>	956	In-situ measurement of deuterium retention in W under plasma exposure, <i>T. Watanabe, T. Kaneko, N. Matsunami, N. Ohno, S. Kajita and T. Kuwabara</i>	1049	Dependence of recycling and edge profiles on lithium evaporation in high triangularity, high performance NSTX H-mode discharges, <i>R. Maingi, T.H. Osborne, M.G. Bell, R.E. Bell, D.P. Boyle, J.M. Canik, A. Diallo, R. Kaita, S.M. Kaye, H.W. Kugel, B.P. LeBlanc, S.A. Sabbagh, C.H. Skinner, V.A. Soukhanovskii and The NSTX Team</i>	1134
Secondary electron emission from a charged spherical dust particle due to electron incidence according to OML model, <i>Y. Tomita, Z.H. Huang, Y.D. Pan, G. Kawamura and L.W. Yan</i>	881	Fuel retention in JET ITER-Like Wall from post-mortem analysis, <i>K. Heinola, A. Widdowson, J. Likonen, E. Alves, A. Baron-Wiechec, N. Barradas, S. Brezinsek, N. Catarino, P. Coad, S. Koivuranta, G.F. Matthews, M. Mayer, P. Petersson and JET-EFDA contributors</i>	961	Electrochemical study of hydrogen permeation through tungsten near room temperature, <i>A. Manhard, S. Kapser and L. Gao</i>	1057	Lithium wall conditioning by high frequency pellet injection in RFX-mod, <i>P. Innocente, D.K. Mansfield, A.L. Roquemore, M. Agostini, S. Barison, A. Canton, L. Carraro, R. Cavazzana, G. De Masi, A. Fassina, S. Fiameni, L. Grando, B. Rais, F. Rossetto and P. Scarin</i>	1138
Tritium absorption and desorption in ITER relevant materials: comparative study of tungsten dust and massive samples, <i>C. Grisolia, E. Hodille, J. Chene, S. Garcia-Argote, G. Pieters, A. El-Kharbachi, L. Marchetti, F. Martin, F. Miserque, D. Vrel, M. Redolfi, V. Malard, G. Dinescu, T. Acsente, F. Gensdarmes, S. Peillon, B. Pegourié and B. Rousseau</i>	885	2D tritium distribution on tungsten tiles used in JET ITER-like wall project, <i>Y. Hatano, A. Widdowson, N. Bekris, C. Ayres, A. Baron-Wiechec, J. Likonen, S. Koivuranta, J. Likonen, K. Yumizuru and JET-EFDA contributors</i>	966	The influence of neon or argon impurities on deuterium permeation in tungsten, <i>M. Ishida, H.T. Lee and Y. Ueda</i>	1062	First liquid lithium limiter biasing experiments in the TJ-II stellarator, <i>F.L. Tabarés, E. Oyarzabal, D. Tafalla, A.B. Martin-Rojo, D. Alegre, A. de Castro and the TJ-II Team</i>	1142
Scrape-off layer ion temperature measurements at the divertor target during type III ELMs in MAST measured by RFEA, <i>S. Elmore, S.Y. Allan, G. Fishpool, A. Kirk, M. Kočan, P. Tamain, A.J. Thornton and the MAST Team</i>	889	Rate equations modeling for hydrogen inventory studies during a real tokamak material thermal cycle, <i>X. Bonnin, E. Hodille, N. Ning, C. Sang and Ch. Grisolia</i>	970	Effects of surface conditions on the plasma-driven permeation behavior through a ferritic steel alloy observed in VEHICLE-1 and QUEST, <i>H. Zhou, Y. Hirooka, H. Zushi, A. Kuzmin, N. Ashikawa, T. Muroga, A. Sagara and The QUEST group</i>	1066	High flux irradiations of Li coatings on polycrystalline W and ATJ graphite with D, He, and He-seeded D plasmas at Magnum PSI, <i>A.L. Neff, J.P. Allain, F. Bedoya, T.W. Morgan and G. De Temmerman</i>	1147
SOL turbulence and the interpretation of BES and GPI experiments, <i>D. Moulton, Y. Marandet, P. Tamain, Ph. Ghendrih and M. Groth</i>	893	Deuterium retention in tungsten exposed to mixed D+N plasma at divertor relevant fluxes in Magnum-PSI, <i>H.T. Lee, G. De Temmerman, L. Gao, T. Schwarz-Selinger, G. Meisl, T. Höschen and Y. Ueda</i>	974	First-passage kinetic Monte Carlo on lattices: Hydrogen transport in lattices with traps, <i>U. von Toussaint, T. Schwarz-Selinger and K. Schmid</i>	1075	Experiments on FTU with an actively water cooled liquid lithium limiter, <i>G. Mazzitelli, M.L. Apicella, G. Apruzzese, F. Crescenzi, F. Iannone, G. Maddaluno, V. Pericoli-Ridolfini, S. Roccella, M. Reale, B. Viola, I. Lyublinski, A. Vertkov and FTU Team</i>	1152
Reconstruction of NSTX midplane neutral density profiles from visible imaging data, <i>D.P. Stotler, F. Scotti, R.E. Bell, B.P. LeBlanc and R. Raman</i>	897	Effect of temperature on microstructures and retention properties in tungsten exposed to D+He+Be mixture plasmas in PISCES, <i>N. Iijima, M. Miyamoto, D. Nishijima, M.J. Baldwin, R.P. Doerner, Y. Ueda, A. Sagara and T. Höschen</i>	979	A molecular dynamics study on bubble growth in tungsten under helium irradiation, <i>R. Kobayashi, T. Hattori, T. Tamura and S. Ogata</i>	1071	Protection of tokamak plasma facing components by a capillary porous system with lithium, <i>I. Lyublinski, A. Vertkov, S. Mirnov and V. Lazarev</i>	1156
Thermal equilibrium/disequilibrium features in the excited-state temperature of atomic helium in MAP-II divertor simulator, <i>S. Kado</i>	902	Temperature influence on deuterium retention for Be–W mixed thin films prepared by Thermionic Vacuum Arc method exposed to PISCES B plasma, <i>I. Jepu, R.P. Doerner, M.J. Baldwin, C. Porosnicu and C.P. Lungu</i>	983	Particle balance in long duration RF driven plasmas on QUEST, <i>K. Hanada, H. Zushi, N. Yoshida, N. Yugami, T. Honda, M. Hasegawa, K. Mishra, A. Kuzmin, K. Nakamura, A. Fujisawa, H. Idei, Y. Nagashima, O. Watanabe, T. Onchi, H. Watanabe, K. Tokunaga, A. Higashijima, S. Kawasaki, H. Nakashima, Y. Takase, A. Fukuyama, O. Mitarai and Y.K.M. Peng</i>	1084	Effect of lithium in the DIII-D SOL and plasma-facing surfaces, <i>G.L. Jackson, C.P. Chrobak, A.G. McLean, R. Maingi, D.K. Mansfield, A.L. Roquemore, P. Diwakar, A. Hassanein, A. Lietz, D.L. Rudakov, T. Sizyuk and J. Tripathi</i>	1160
Dependence of LTX plasma performance on surface conditions as determined by <i>in situ</i> analysis of plasma facing components, <i>M. Lucia, R. Kaita, R. Majeski, F. Bedoya, J.P. Allain, T. Abrams, R.E. Bell, D.P. Boyle, M.A. Jaworski and J.C. Schmitt</i>	907	Deuterium retention and surface modifications of nanocrystalline tungsten films exposed to high-flux plasma, <i>M.H.J. 't Hoen, D. Dellasega, A. Pezzoli, M. Passoni, A.W. Kleyn and P.A. Zeijlmans van Emmichoven</i>	989	Global gas balance and influence of atomic hydrogen irradiation on the wall inventory in steady-state operation of QUEST tokamak, <i>A. Kuzmin, H. Zushi, I. Takagi, S.K. Sharma, A. Rusinov, Y. Inoue, Y. Hirooka, H. Zhou, M. Kobayashi, M. Sakamoto, K. Hanada, N. Yoshida, K. Nakamura, A. Fujisawa, K. Matsuoka, H. Idei, Y. Nagashima, M. Hasegawa, T. Onchi, S. Banerjee and K. Mishra</i>	1087	Lithium sputtering from lithium-coated plasma facing components in the NSTX divertor, <i>F. Scotti, V.A. Soukhanovskii, J.-W. Ahn, R.E. Bell, S.P. Gerhardt, M.A. Jaworski, R. Kaita, H.W. Kugel, A.G. McLean, E.T. Meier, M. Pedestà and A.L. Roquemore</i>	1165
<i>In-situ</i> analysis of the first wall by laser-induced breakdown spectroscopy in the TEXTOR tokamak: Dependence on the magnetic field strength, <i>Q. Xiao, R. Hai, H. Ding, A. Huber, V. Philipps, N. Gierse and G. Sergienko</i>	911	Helium irradiation effects on tritium retention and long-term tritium release properties in polycrystalline tungsten, <i>Y. Nobuta, Y. Hatano, M. Matsuyama, S. Abe, Y. Yamauchi and T. Hino</i>	993	Modeling the reduction of gross lithium erosion observed under high-flux deuterium bombardment, <i>T. Abrams, M.A. Jaworski, R. Kaita, J.H. Nichols, D.P. Stotler, G. De Temmerman, M.A. van den Berg, H.J. van der Meiden and T.W. Morgan</i>	1087	Laboratory experiments of uptake and release of hydrogen isotopes in liquid lithium, <i>E. Oyarzabal, A.B. Martin-Rojo and F.L. Tabarés</i>	1173
Characterization of deuterium retention and co-deposition of fuel with lithium on the divertor tile of EAST using laser induced breakdown spectroscopy, <i>C. Li, D. Zhao, Z. Hu, X. Wu, G.-N. Luo, J. Hu and H. Ding</i>	915	Effects of grain structure on D retention in W under simultaneous D-He irradiation, <i>T.J. Finlay, J.W. Davis and A.A. Haasz</i>	997	Effects of temperature and surface contamination on D retention in ultrathin Li films on TZM, <i>A.M. Capece, J.P. Roszell, C.H. Skinner and B.E. Koel</i>	1091	Vertical flow in the Thermoelectric Liquid Metal Plasma Facing Structures (TELS) facility at Illinois, <i>W. Xu, P. Fiffis, M. Szott, K. Kalathiparambil, S. Jung, M. Christenson, I. Haehnlein, A. Kapat, D. Andruczyk, D. Curreli and D.N. Ruzic</i>	1181
LIBS analysis of tungsten coatings exposed to Magnum PSI ELM-like plasma, <i>K. Piip, G. De Temmerman, H.J. van der Meiden, A. Lissovski, J. Karhunen, M. Aints, A. Hakola, P. Paris, M. Laan, J. Likonen, I. Jögi, J. Kozlova and H. Mändar</i>	919	Deuterium retention on He-irradiated F82H with surface impurity layer, <i>N. Shinoda, Y. Yamauchi and Y. Nobuta</i>	1001	Role of electron temperature in the particle transport in the pedestal during pedestal evolution, <i>M. Willensdorfer, E. Fable, E. Wolfrum, F. Aumayr, R. Fischer, F. Reimold, F. Ryter and the ASDEX Upgrade Team</i>	1096	Heat flux management via advanced magnetic divertor configurations and divertor detachment, <i>E. Kolemen, S.L. Allen, B.D. Bray, M.E. Fenstermacher, D.A. Humphreys, A.W. Hyatt, C.J. Lasnier</i>	
LIBS for tungsten diagnostics in vacuum: Selection of analytes, <i>A. Lissovski, K. Piip, L. Hämarik, M. Aints, M. Laan, P. Paris, A. Hakola and J. Karhunen</i>	923	Defect annealing and thermal desorption of deuterium in low dose HFIR neutron-irradiated tungsten, <i>M. Shimada, M. Hara, T. Otsuka, Y. Oya and Y. Hatano</i>	1005	Fuel recycling and natural density in EAST H-mode discharges, <i>Y.W. Yu, J.S. Hu, B. Cao, Z. Sun and EAST team</i>	1096		
		Development of positron annihilation spectroscopy for investigating deuterium decorated voids in neutron-irradiated tungsten, <i>C.N. Taylor, M. Shimada, B.J. Merrill, D.W. Akers and Y. Hatano</i>	1009	Effect of the RF wall conditioning on the high performance plasmas in the Large Helical Device, <i>H. Takahashi, M. Osakabe, K. Nagaoka, H. Nakano, M. Tokitani, K. Fujii, S. Murakami, Y. Takeiri, T. Seki, K. Saito, H. Kasahara, R. Seki, S. Kamio, S. Masuzaki, T. Mutoh and the LHD Experiment Group</i>	1100		
		Thermal desorption from self-damaged tungsten exposed to deuterium atoms, <i>Yu.M. Gasparyan, O.V. Ogorodnikova, V.S. Eftimov, A. Mednikov, E.D. Marenkov, A.A. Pisarev, S. Markelj and I. Čadež</i>	1013	Isotope exchange by Ion Cyclotron Wall Conditioning on JET, <i>T. Wauters, D. Douai, D. Kogut, A. Lysssoivan, S. Brezinsek</i>			

A.W. Leonard, M.A. Makowski, A.G. McLean, R. Maingi, R. Nazikian, T.W. Petrie, V.A. Soukhanovskii and E.A. Unterberg	1186	A.W. Leonard, T.C. Luce, A.G. McLean, R. Maingi, R.A. Moyer, W.M. Solomon, V.A. Soukhanovskii, F. Turco and J.G. Watkins	1225
Radiative snowflake divertor studies in DIII-D, V.A. Soukhanovskii, S.L. Allen, M.E. Fenstermacher, D.N. Hill, C.J. Lasnier, M.A. Makowski, A.G. McLean, W.H. Meyer, E. Kolemen, R.J. Groebner, A.W. Hyatt, A.W. Leonard, T.H. Osborne and T.W. Petrie	1191	Combination of helical ferritic-steel inserts and flux-tube-expansion divertor for the heat control in tokamak DEMO reactor, T. Takizuka, S. Tokunaga, K. Hoshino, K. Shimizu and N. Asakura	1229
Experimental investigation of neon seeding in the snowflake configuration in TCV, H. Reimerdes, G.P. Canal, B.P. Duval, B. Labit, T. Lunt, F. Nespoli, W.A.J. Vijvers, G. De Temmerman, C. Lowry, T.W. Morgan, B. Tal and M. Wischmeier	1196	Evaluation of target-plate heat flux for a possible snowflake divertor in CFETR using SOLPS, S.F. Mao, Y. Guo, X.B. Peng, Z.P. Luo, B.J. Xiao, Y.T. Song, D.M. Yao, S.Z. Zhu and M.Y. Ye	1233
Modeling detachment physics in the NSTX snowflake divertor, E.T. Meier, V.A. Soukhanovskii, R.E. Bell, A. Diallo, R. Kaita, B.P. LeBlanc, A.G. McLean, M. Podestà, T.D. Rognlien and F. Scotti	1200	Simulation study of power load with impurity seeding in advanced divertor "short super-X divertor" for a tokamak reactor, N. Asakura, K. Hoshino, K. Shimizu, K. Shinya, H. Utoh, S. Tokunaga, K. Tobita and N. Ohno	1238
Analysis of FAST snowflake divertor by EDGE2D/EIRENE, B. Viola, V. Pericoli Ridolfini, N. Visona, G. Corrigan, D. Harting, G. Maddaluno and R. Zagórski	1205	Designing divertor targets for uniform power load, W. Dekeyser, D. Reiter and M. Baelmans	1243
The effect of the Super-X divertor of MAST Upgrade on impurity radiation as modelled by SOLPS, E. Havlíčková, M. Wischmeier, B. Lipschultz and G. Fishpool	1209	Status of technology R&D for the ITER tungsten divertor monoblock, T. Hirai, F. Escourbiac, V. Barabash, A. Durocher, A. Fedosov, L. Ferrand, T. Jokinen, V. Komarov, M. Merola, S. Carpentier-Chouchana, N. Arkhipov, V. Kuznetsov, A. Volodin, S. Suzuki, K. Ezato, Y. Seki, B. Riccardi, M. Bednarek and P. Gavila	1248
Intrinsic instabilities in X-point geometry: A tool to understand and predict the Scrape Off Layer transport in standard and advanced divertors, F. Militello and Y. Liu	1214	High heat-flux self-rotating plasma-facing component: Concept and loading test in TEXTOR, A. Terra, G. Sergienko, M. Hubeny, A. Huber, Ph. Mertens, V. Philipps and the TEXTOR team	1252
A novel approach to magnetic divertor configuration design, M. Blommaert, M. Baelmans, W. Dekeyser, N.R. Gauger and D. Reiter	1220	Interaction of a tin-based capillary porous structure with ITER/DEMO relevant plasma conditions, T.W. Morgan, D.C.M. van den Bekerom and G. De Temmerman	1256
Application of the radiating divertor approach to innovative tokamak divertor concepts, T.W. Petrie, S.L. Allen, M.E. Fenstermacher, R.J. Groebner, C.T. Holcomb, E. Kolemen, R.J. La Haye, C.J. Lasnier		Author Index	i