<ol> <li>1.1. HSX: IMPROVING THE STELLARATOR</li> <li>1.2. THE HSX DEVICE AND THE PHYSICS.</li> <li>1.3. PROPOSED EXPERIMENTAL PROGRAM</li> <li>1.4. STATUS OF HSX.</li> </ol>
2. THE PHYSICS OF HSX
<ul> <li>2.1. INTRODUCTION</li></ul>
3. HSX EXPERIMENTAL PROGRAM
<ul> <li>3.1. CONFIRMATION OF MAGNETIC GEOM</li> <li>3.1.A. Vacuum Flux Surface Mapping</li> <li>3.1.B. Measurement of the Magnetic F</li> <li>3.1.C. Electron or Ion Injection</li> <li>3.2. CONTROL OF DIRECT LOSS ORBITS</li> <li>3.3. NONLINEAR VISCOSITY IN HSX: A D</li> <li>THEORY?</li> </ul>
3.4. MEASUREMENT OF REDUCED HELICA 3.5. VARIATION OF NEOCLASSICAL ELEC 3.6. FLUCTUATION INDUCED TRANSPORT CURVATURE
4. HSX CONSTRUCTION AND DIA
4.1. STATUS OF HSX CONSTRUCTION

## 5. SCHEDULE, STAFFING AND BU

VITA

## TABLE OF CONTENTS

1. SUMMARY	1
<ul> <li>1.1. HSX: IMPROVING THE STELLARATOR AS A FUSION REACTOR.</li> <li>1.2. THE HSX DEVICE AND THE PHYSICS.</li> <li>1.3. PROPOSED EXPERIMENTAL PROGRAM</li> </ul>	
1.4. STATUS OF HSX.	13
2. THE PHYSICS OF HSX	15
2.1. INTRODUCTION	15
2.1.A. Quasi-Helically Symmetric Stellarators	
2.1.B. The Development of the HSX Stellarator	
2.2. THE QUASI-HELICAL STELLARATOR AS A FUSION REACTOR	21
2.3. PHYSICS PROPERTIES OF HSX.	
2.3.A. Magnetic Field Spectrum and Vacuum Flux Surjaces	23
2.3.B. Single Particle Orbits and Neoclassical Transport	
2.3.C. The Firsch-Schuler Current and Finite Deta Effects	
2.3.D. DOOISH UP CUITERING TO SAND FLEXIBILITY OF MAGNETIC GEOMETRY	40
2.4. AUXILIAR COLLS AND I LEXIBLITT OF MACHENE GLOWER CT.	۰۰۰۰ ۲۵ ۸۸
2.5. RELATIONSHIP OF HSA TO WENDELSTEIN / A AND LHD	
3. HSX EXPERIMENTAL PROGRAM	
3. 1. CONFIRMATION OF MAGNETIC GEOMETRY	
<ul> <li>3. HSX EXPERIMENTAL PROGRAM</li></ul>	<b> 48</b> 52 52
<ul> <li>3. HSX EXPERIMENTAL PROGRAM</li></ul>	<b>48</b> 52 52 52
<ul> <li>2.5. RELATIONSHIP OF HSX TO WENDELSTEIN 7X AND LHD.</li> <li>3. HSX EXPERIMENTAL PROGRAM</li></ul>	<b>48</b> 
<ul> <li>2.5. RELATIONSHIP OF HSX TO WENDELSTEIN 7X AND LHD.</li> <li>3. HSX EXPERIMENTAL PROGRAM</li></ul>	<b>48</b> 
<ul> <li>2.5. RELATIONSHIP OF HSX TO WENDELSTEIN 7X AND LHD.</li> <li>3. HSX EXPERIMENTAL PROGRAM</li></ul>	48 52 52 54 54 59 61 SITION
<ul> <li>2.5. RELATIONSHIP OF HSX TO WENDELSTEIN /X AND LHD.</li> <li>3. HSX EXPERIMENTAL PROGRAM</li></ul>	48 
<ul> <li>2.5. RELATIONSHIP OF HSX TO WENDELSTEIN 7X AND LHD.</li> <li>3. HSX EXPERIMENTAL PROGRAM</li></ul>	48 52 52 54 54 59 61 SITION 67 75
<ul> <li>3. HSX EXPERIMENTAL PROGRAM</li></ul>	48 52 52 54 59 61 SITION 67 75 79
<ul> <li>2.5. RELATIONSHIP OF HSX TO WENDELSTEIN 7X AND LHD.</li> <li>3. HSX EXPERIMENTAL PROGRAM</li></ul>	48 52 52 54 59 61 SITION 67 75 75
<ul> <li>2.5. RELATIONSHIP OF HSX TO WENDELSTEIN 7X AND LHD.</li> <li>3. HSX EXPERIMENTAL PROGRAM</li></ul>	48 52 52 54 59 61 SITION 67 75 79 67 79 
<ul> <li>3. HSX EXPERIMENTAL PROGRAM</li></ul>	48 52 52 54 59 61 51TION 67 75 79 86 96
<ul> <li>3. HSX EXPERIMENTAL PROGRAM</li></ul>	48 52 52 54 59 61 SITION 67 75 67 79 86 96
<ul> <li>2.3. RELATIONSHIP OF HSA TO WENDELSTEIN TA AND LHD.</li> <li>3. HSX EXPERIMENTAL PROGRAM</li></ul>	48 52 52 54 59 61 57 61 51TION 67 75 79 86 