

Contents

<i>List of contributors</i>	<i>page</i> ix
<i>Preface</i>	xix
1 X-ray polarimetry: historical remarks and other considerations <i>M. C. Weisskopf</i>	1
Part I Polarimetry techniques	9
2 Scattering polarimetry in high-energy astronomy <i>M. L. McConnell</i>	11
3 Photoelectric polarimeters <i>R. Bellazzini, G. Spandre</i>	19
4 Bragg crystal polarimeters <i>E. Silver, H. Schnopper</i>	34
5 X-ray polarimetry with the photon-counting pixel detector Timepix <i>T. Michel et al.</i>	42
6 High-energy polarized photon interactions with matter: simulations with Geant4 <i>F. Longo et al.</i>	48
7 The GPD as a polarimeter: theory and facts <i>P. Soffitta et al.</i>	54
8 Ideal gas electron multipliers (GEMs) for X-ray polarimeters <i>T. Tamagawa et al.</i>	60
9 Broad-band soft X-ray polarimetry <i>H. L. Marshall et al.</i>	66
10 Feasibility of X-ray photoelectric polarimeters with large field of view <i>F. Muleri et al.</i>	72
11 Angular resolution of a photoelectric polarimeter <i>F. Lazzarotto et al.</i>	79

vi	<i>Contents</i>	
12	Development of a Thomson X-ray polarimeter <i>P. V. Rishin et al.</i>	83
13	Hard X-ray / soft gamma-ray polarimetry using a Laue lens <i>N. Barrière et al.</i>	88
	Part II Polarized emission in X-ray sources	93
14	Probing strong gravity effects with X-ray polarimetry <i>M. Dovčiak</i>	95
15	X-ray polarization from black holes in the thermal state <i>J. D. Schnittman, J. H. Krolik</i>	103
16	Strong-gravity effects acting on polarization from orbiting spots <i>V. Karas</i>	109
17	Polarization of thermal emission from accreting black holes <i>M. Dovčiak et al.</i>	117
18	X-ray polarimetry and radio-quiet AGN <i>G. Matt</i>	122
19	The soft X-ray polarization in obscured AGN <i>S. Bianchi et al.</i>	130
20	The polarization of complex X-ray sources <i>R. W. Goosmann</i>	136
21	Polarization of Compton X-rays from jets in AGN <i>A. McNamara et al.</i>	142
22	Polarization of X-ray lines from galaxy clusters and elliptical galaxies <i>I. V. Zhuravleva et al.</i>	146
23	Polarization characteristics of rotation-powered pulsars <i>A. K. Harding</i>	150
24	Polarized X-rays from magnetized neutron stars <i>D. Lai et al.</i>	157
25	Polarization properties of X-ray millisecond pulsars <i>J. Poutanen</i>	168
26	X-ray polarization signatures of neutron stars <i>P. Ghosh</i>	176
27	Polarization from the oscillating magnetized accretion torus <i>J. Horák, M. Bursa</i>	182
28	X-ray polarization from accreting white dwarfs and associated systems <i>K. Wu et al.</i>	187
29	Polarization of pulsar wind nebulae <i>N. Bucciantini</i>	195

<i>Contents</i>		vii
30	X-ray polarization of gamma-ray bursts <i>D. Lazzati</i>	202
31	Central engine afterglow from GRBs and the polarization signature <i>Y. Z. Fan</i>	209
32	GRB afterglow polarimetry past, present and future <i>S. Covino</i>	215
33	Gamma-ray polarimetry with SPI <i>A. J. Dean</i>	222
34	INTEGRAL/IBIS observations of the Crab nebula and GRB 041219A polarization <i>P. Laurent et al.</i>	230
35	<i>Fermi</i> results on the origin of high-energy emission in pulsars <i>S. McGlynn et al.</i>	238
36	Diagnostics of the evolution of spiral galaxies in a cluster environment <i>M. Weżgowiec et al.</i>	243
Part III Future missions		249
37	Gravity and Extreme Magnetism SMEX (GEMS) <i>J. Swank et al.</i>	251
38	Programs of X-ray polarimetry in Italy <i>E. Costa et al.</i>	260
39	A polarimeter for <i>IXO</i> <i>R. Bellazzini et al.</i>	269
40	Polarimetry with ASTRO-H soft gamma-ray detector <i>H. Tajima et al.</i>	275
41	The Energetic X-ray Imaging Survey Telescope and its polarization sensitivity <i>A. B. Garson et al.</i>	284
42	PoGOLite: a balloon-borne soft gamma-ray polarimeter <i>M. Pearce</i>	291
43	Studies of neutron background rejection in the PoGOLite polarimeter <i>M. Kiss</i>	299
44	Observing polarized X-rays with PoGOLite <i>M. Axelsson</i>	305
45	Pre-flight qualification tests of the PoGOLite detector system <i>M. S. Jackson et al.</i>	309
46	The Gamma-RAY Polarimeter Experiment (GRAPE) balloon payload <i>P. F. Bloser et al.</i>	314
47	POLAR: an instrument dedicated to GRB polarization measurement <i>N. Produit</i>	322

viii	<i>Contents</i>	
48	Polarization detection capability of GRIPS <i>J. Greiner et al.</i>	327
49	X-ray and γ -ray polarimetry small-satellite mission PolariS <i>K. Hayashida</i>	333
50	GAP aboard the solar-powered sail mission <i>D. Yonetoku et al.</i>	339
51	Hard X-ray polarimeter for small-satellite missions <i>R. Cowsik et al.</i>	345
52	Performance of hard X-ray polarimeter: PHENEX <i>S. Gunji et al.</i>	350
53	GRB polarimetry with POET <i>M. L. McConnell</i>	355
	<i>Author index</i>	359
	<i>Subject index</i>	361