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Craig L. Sarazin

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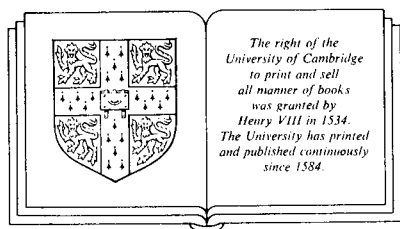
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# *X-ray emission from clusters of galaxies*

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## PREFACE

As this book was being completed, observational X-ray astronomy was in a relatively quiet period between the demise of the *Einstein* X-ray observatory, and the launch of the next generation X-ray observatory, AXAF. This seemed like a good time to summarize what we have learned about the X-ray emission of clusters of galaxies. This book is mainly devoted to a review of the observational properties of X-ray clusters of galaxies and of the theoretical understanding we currently have of the physical state, dynamics, and origin of the hot intracluster gas. The book also contains less complete reviews of the optical and radio properties of clusters of galaxies, and of their dynamics.

Much of the material in this book first appeared in a review article in *Reviews of Modern Physics* (Sarazin, 1986a). I should like to thank Ed Salpeter for suggesting this review, and for many helpful suggestions.

Andy Fabian, Richard Mushotzky, Paul Nulsen, Simon White and an anonymous referee very kindly provided detailed comments on an early draft of the manuscript and caught many significant errors. I really would like to thank them for all their help. I am also indebted to John Bahcall, James Binney, Pat Henry, Hernan Quintana, Yoel Rephaeli, Herb Rood, Hy Spinrad, Mel Ulmer, and Ray White for helpful comments, suggestions, and unpublished results. I should particularly like to thank John Bahcall for his encouragement. Figures for the original review paper and for this book were very kindly provided by Neta Bahcall, Jack Burns, Claude Canizares, Christine Jones, Andy Fabian, Bill Forman, Paul Gorenstein, Mark Henriksen, Roger Lynds, George Miley, Richard Mushotzky, Chris O'Dea, Herb Rood, Steve Strom, and Simon White. I should like particularly to thank Christine Jones and Bill Forman for producing special figures from the *Einstein* X-ray data.

Much of the original review article was written while I was a visitor at the Institute for Advanced Study in Princeton, N.J., and I would like to thank the



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The manuscript for the book was completed while I was a Visiting Fellow at the Joint Institute for Laboratory Astrophysics of the University of Colorado and the National Bureau of Standards. I should like to thank the JILA Fellows for their hospitality. During this sabbatical leave I was also supported in part by a Sesquicentennial Fellowship from the University of Virginia.

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This work would have been impossible without the support and patient understanding of my wife Jane.