

Preface

Active galaxies involve some of the most extreme conditions and some of the most intriguing phenomena found anywhere in the universe and their study is amongst the hottest areas of research interest, yet there is currently no book that makes the topic available at a non-mathematical and not too technical a level. The purpose of this book is to try and fill this gap.

The book is aimed at readers who already have an interest in and some knowledge of astronomy, who wish to get to grips with the confusing plethora of types of active galaxies – perhaps in order to go on to study some aspect of the topic in greater detail, perhaps so that they can extend their observational program, perhaps simply because active galaxies are fascinating in their own right. The study of active galaxies

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dates back to the beginning of the twentieth century, but serious work on them has been undertaken only in the last five decades or so. New types of active galaxies and new aspects to existing known types have been found every time a new part of the spectrum – radio, infrared, ultraviolet, x-ray or gamma ray – has been opened up to observers. This has resulted in innumerable apparently different varieties of objects out there in extragalactic space and this can confuse and perhaps put off a student new to the subject. I hope that this book will go far towards reducing the muddle, and to this end Appendix 2 lists all the types of active galaxy names that I have been able to discover in current use, together with a brief note about each of them. I would recommend that the reader has frequent recourse to this appendix, at least until he or she has become familiar with the main classes of active galaxies.

Observers with small or moderate sized telescopes have probably been put off from trying to look at active galaxies since most of the images that they will have encountered will have come from the largest of professional telescopes. This impression though is false – some active galaxies can even be found using binoculars. Many more are accessible through the commonly available 0.15–0.3m telescopes, and hundreds may be imaged if a CCD camera is also to hand. To try and encourage the observation and study of active galaxies by as wide a range of astronomers as possible, the final chapter of the book lists, among other things, the observing details of the brighter active galaxies.

Since the book is intended to provide a readable broad account of active galaxies, the use of equations has been (almost) completely avoided. Although active galaxies is a highly complex field of study, some of the very fine details have been omitted so that the reader can obtain an understanding of the whole subject without becoming too bogged down in the technicalities. Also the more specialist or secondary topics have been separated from the main text into boxes and these can be looked at by the reader or not as the need arises.

While the book is not intended to provide the basis for specialist or research level studies of active galaxies, it is possible that it may be useful as background material for anyone with such interests. In

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particular, since all aspects of all types of active galaxies are included, research workers may find it useful as a quick reference to the properties of and phenomena within those types of active galaxies that are outside their specialisms.

The ambiguous numbers “billion” and “trillion” are used here to mean 1,000,000,000 and 1,000,000,000,000 respectively. When it is needed, for example in converting redshifts to distances, the value of 71 km/s per megaparsec (21.5 km/s per million light years) has been employed. Finally I have used two terms throughout the book that may not be familiar to all readers. The first is the old-fashioned time period of an aeon. This equals 1,000,000,000 years and so is ideally suited to the discussion of the lives of galaxies. The second word is the megasun. This is a term that I have coined for a mass of a million solar masses and which is valuable during discussions of massive black holes and related topics.

I hope that you, the reader, will be as fascinated by active galaxies as I have been, and that some of the mystery and confusion that surrounds the topic will be reduced by this book. I hope also that some readers may be encouraged to go out with their binoculars and telescopes and see what’s really happening out there for themselves.

Chris Kitchen, April 2006

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That Drive Them

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