

PREFACE

IAU symposium No. 146, organized by the Ecole Normale Supérieure, was held on June 1990 in Paris. It was devoted to the confrontation of recent results on galaxy dynamics with observations of extragalactic molecular clouds.

Our knowledge of the distribution of molecular clouds has progressed considerably in the last years, due to enhanced spatial resolution and receiver sensitivity. While extragalactic molecules were discovered in the 1970's, they were mapped with only $\approx 1'$ resolution and detected in 15% of galaxies. In 1980, only about 60 galaxies had been observed and 10 detected. In the 1980's, large millimetric telescopes and interferometers have begun to operate, providing spatial resolution down to $2''$. The detection rate of galaxies has become nearly 90%, and several hundredths of them have been studied. This step forward has made possible a better understanding of star-formation processes in relation to galaxy dynamics. The molecular gas is an excellent tracer of density waves, bar distortions and ring structures in the center of galaxies, where HI is usually absent. Major developments are highlighted in these proceedings: molecular spiral structure and location relative to other arm tracers, detection of early-type and gas-poor galaxies, of rare molecules, and exploration of remote galaxies up to a redshift of 0.15.

On the theoretical side, dynamical theories can now be tested and in particular the density wave theory for gaseous disks. Interactions between galaxies are well known for providing major starburst events, and in particular mergers between galaxies responsible for the ultra-luminous IRAS sources. Galaxy simulations have benefited from the huge increase in computer efficiency, and stellar systems with self-gravity and gas hydrodynamics included are now currently modeled.

The oral contributions to the symposium have been grouped in thematic order, very close to the order of their presentations, and poster contributions have been interleaved according to their relevant domain. The panel discussion on the conversion ratio between CO integrated intensity and H_2 column density was very lively, but it was impossible to pass on to these written proceedings the vivacity and intensity of debates. Only a summary from the contributors gives an idea of the different arguments and positions discussed.

We are particularly grateful to Marie-Françoise Ducos from the Ecole Normale Supérieure who coordinated the practical organization of the meeting; she solved the numerous unavoidable problems arising before and during the meeting. Her serene and methodic way to handle everything was precious and comforting. Many thanks to Koryo Okumura and Jonathan Braine, who assisted her during the Symposium. They also took care of the projection system during the sessions. We also wish to thank Christophe Dupraz who arranged the Mozart Concert at St-Etienne-du-Mont church, which was a real delight.

We also wish to thank all the local organising committee, and in particular Patrick Boissé for their making the meeting possible by their continuous presence and available

help. Finally we are grateful to all the sponsoring organisations listed below for their support, and in particular the Observatoire de Paris and Département de Physique de l'Ecole Normale Supérieure for their financial and practical help. Bruce Elmegreen kindly provided photographs taken at the Conference Banquet, on "Bateaux Mouches".

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