Kapitel 1

Introduction

The comparison of early photographs of galaxies with modern exposures leads to the assumption that we have to deal with static objects with no evolution at all. Indeed there is a development which takes place on time scales too long for us to take any notice of it within the life time of man. Physical considerations lead to an estimation of orders of magnitude of time scales for processes determining the evolution. In this work time scales for some important processes will be estimated in chapter 2.3. In order to get an idea of the different stages of evolution one can compare a sample of objects of different ages. The development can thus be reconstructed. An important tool is the simulation of physical processes taking place to put the observed stages of evolution into a plausible background. In the past various methods have been developed from which one will be presented in chapter 2.4.2. Applying this scheme to a certain starting model allows the study of different stages of evolution. The construction of a starting model is a serious problem though. The Milky-Way containing our solar system is a disc galaxy consisting of three major components which are introduced in chapter 2.2.2. The starting model will be similar to this complicated stellar system. In order to obtain a starting model satisfying the criteria of stability introduced in chapter 3.1.4 theoretical background will be given in chapter 3.1 (chapter 3.2).
The aim of this work is to study the evolution of interacting galactic systems. In order to identify the influence of the interaction non interacting (isolated) systems will be studied first. The stability of the starting model with two modifications is tested in chapter 3.4. The orbits of stars will be calculated by solving the equations of motion obtained by the gravitational law numerically. In addition a gasous component is implemented following further physical laws. Realizing these laws will be introduced in chapter 3.5.
chapter 4 deals with the interaction of a disc galaxy with a dwarf galay in detail. In this context this dwarf galaxy is often refered to as a satellite galaxy or a compagnion. The results are discussed in the context of a physical background. In addition a study has been conducted comparing an observed sample of *edge-on*-galaxies with a sample of simulations. In chapter 3.6.1 and chapter 4.4.1 the devolopment of the vertical structure in the run of the interaction will be studied.
The main point of this work is the development of a procedure simulating star formation beeing introduced in chapter 5. The own character of this procedure lies in the fact that many different ideas from authors like Olson & Kwan (ApJ **349**, 480 (1990)) have been taken. With this method studies are perfomed investigating the star formation rate and dynamic of the gas component for isolated and for interacting systems. The most important results are summarized in chapter 7.

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