

CHAPTER 1

INTRODUCTION

1.1 Remarks on cosmological special relativity

A few remarks on cosmological special relativity are worth to be mentioned now.

First we have the principle of cosmological relativity according to which the laws of physics are the same at all cosmic times. This is an extension of Einstein's principle of relativity according to which the laws of physics are the same in all coordinate systems moving with constant velocities. In cosmology the concept of time ($t = x/v$) replaces that of velocity ($v = x/t$) in Einstein's special relativity.

Second, we have the principle that the Big Bang time τ is always constant with the same numerical value, no matter at what cosmic time it is measured. This is obviously comparable to the assumption of the constancy of the speed of light c in Einstein's special relativity.

Velocity in an expanding Universe is not absolute just as time is not absolute in special relativity. Velocity now depends on at what time an object (or a person) is located; the more backward in time, the slower velocity progresses, the more distances contract, and the heavier the object becomes. In the limit that the object approaches the Big Bang event, velocities and

distances contract to nothing, and the object's energy becomes infinite.

In Einstein's special relativity things depend on the velocity: The faster the object moves, the slower time progresses, the more distances contract, and the heavier the object becomes.

These features are discussed in details in the next chapter.