# Vision

## Introduction

Physical simulators are a tool for studying and understanding the principles of how physical systems work. Our project makes it possible to observe gravitational interactions of multiple bodies and helps to better understand the behavior of gravitational systems, test different models, and clearly see how orbits, systems, and clusters form in the universe.

## Relevance

Most existing gravitational simulators are either too simplified for serious research or too complex for intuitive use. We propose our own approach that combines scientific accuracy with user-friendly visualization. This makes the project a useful educational and research tool: users can not only calculate gravitational forces, but also visually observe how systems evolve, making the learning of astrophysics and numerical methods more intuitive. Our focus is the modeling and visualization of gravitational systems on different scales, researching efficient algorithms for solving the N-body problem

## Goal

We aim to implement a gravitational simulator with a graphical interface. The program will allow users to create different gravitational models or set arbitrary initial conditions and observe how gravitational interactions of bodies unfold within the system. The main focus will be on optimizing algorithms for handling a large number of bodies. We will research and implement methods to accelerate computations in order to ensure efficient simulation execution while maintaining a high level of physical accuracy.