

Predicting the limits of the ELT

Defensio

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Outline

1 Introduction

- Goals
- Motivation
- Action Plan

2 Simulation

- Cluster
 - Time integration
- Milky Way Potential

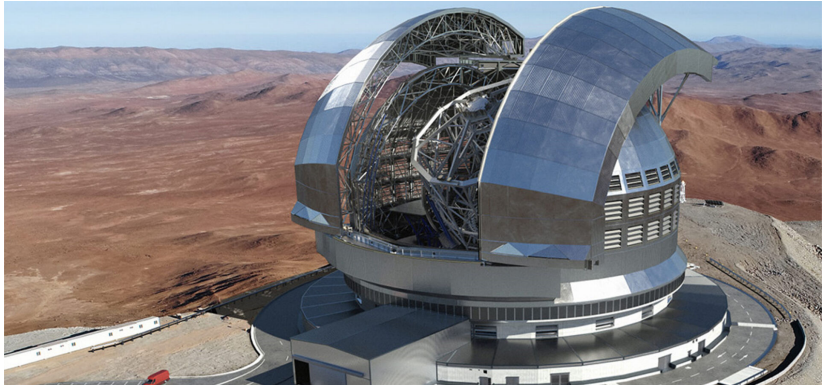
Goals

Primary objective

Estimate reliability limit for future IMF studies in the galactic centre using the ELT!

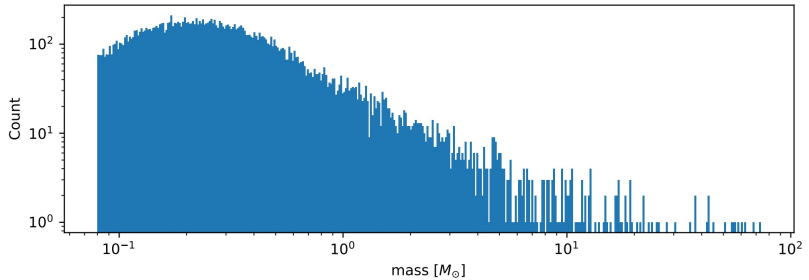
... what?

ELT

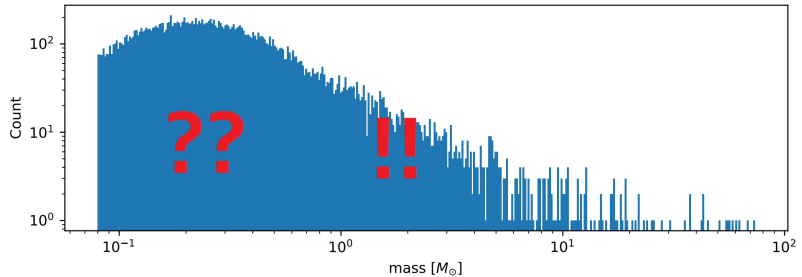


<https://cdn.eso.org/images/banner1920/telescope-dome-landing.jpg>

IMF



Reliability Limit



Motivation

- Universal IMF?
- estimate number of lower-mass stars
- understand star formation process
- N-body simulation with $N \gg 1$
- Clustering of time-dependent data

Action Plan

- I Simulate stars
- II Observe stars
- III Analyze
- IV Measure performance

Parameters

using McLuster

- Plummer density profile
- virial equilibrium
- Kroupa IMF $0.08 M_{\odot}$ to $100 M_{\odot}$
- Metallicity in range 0.5 - 2 solar
- No binaries
- N 1.3k - 40.4k

1. Issue with large N

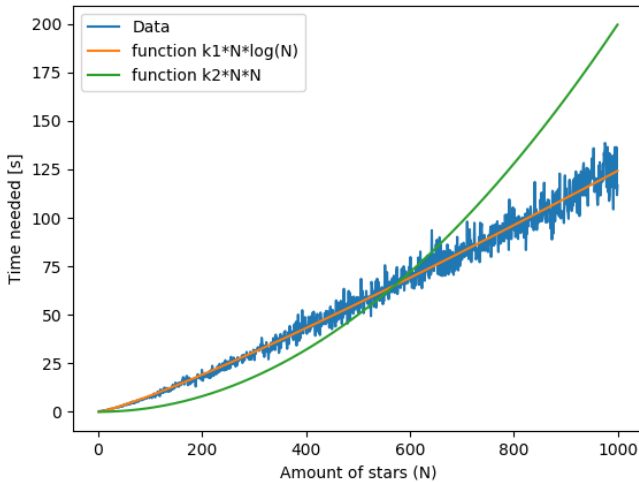
Direct summation $O(N^2)$

Barnes-Hut Algorithm $O(N \log(N))$

- approximate with macro particles
- $\frac{width}{distance} < \theta_{max}$



<http://arborjs.org/docs/img/example-space.png>



Multi-component model

- Black hole: Keplerian potential
- Disk: Miyamoto Nagai potential
- Bulge: Hernquist potential
- Dark matter halo: Navarro–Frenk–White potential