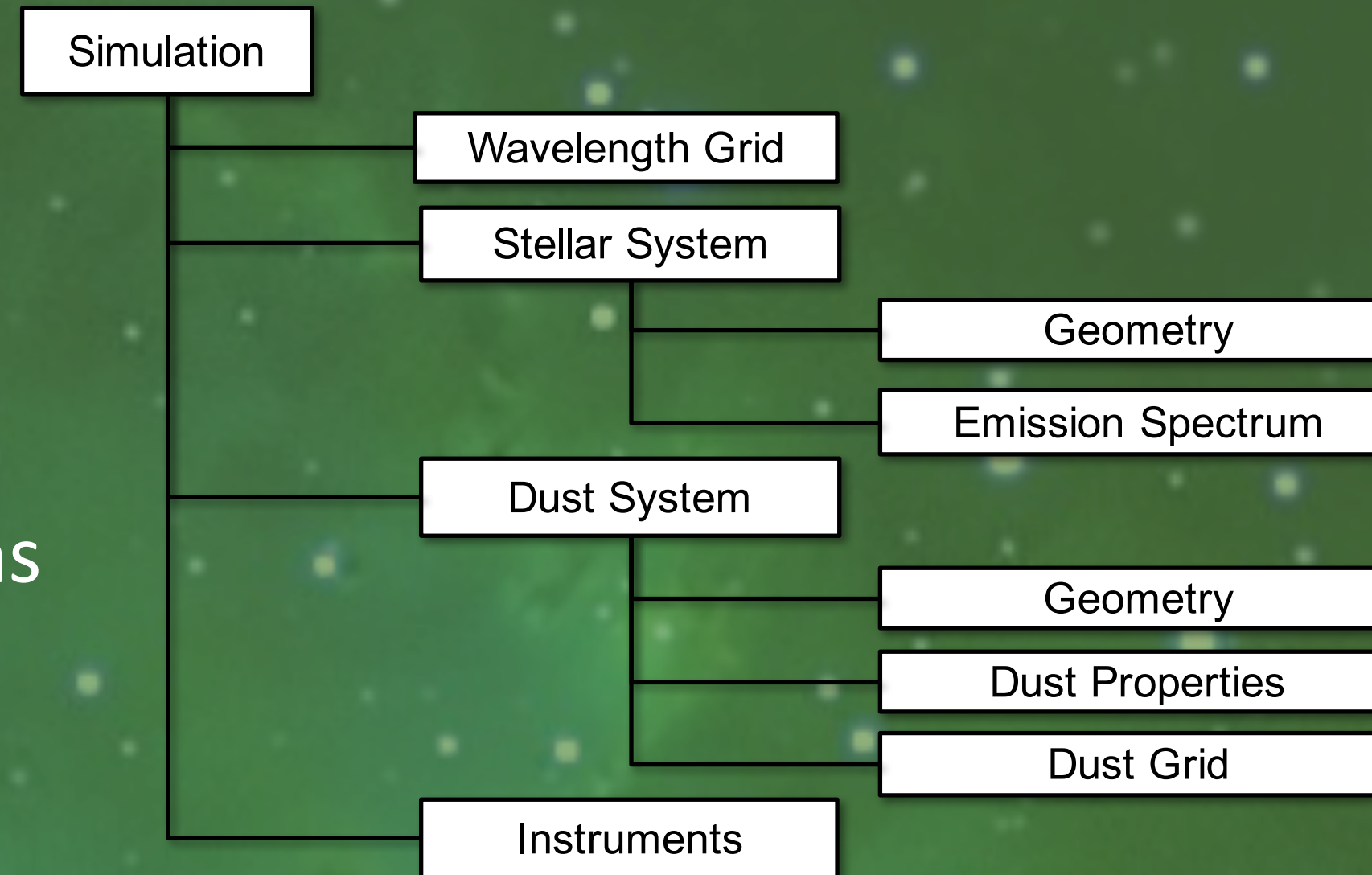# 3D continuum radiative transfer with SKIRT

SKIRT is a state-of-the-art software code for simulating continuum radiation transfer in dusty astrophysical systems, such as galaxies and accretion disks. SKIRT employs the Monte Carlo technique to emulate the relevant physical processes including scattering, absorption and emission by the dust. The code features a wealth of built-in geometries, light source spectra, dust characterizations, dust grids, and detectors, in addition to various mechanisms for importing models generated by hydrodynamical simulations.

User-friendly, easily configurable and actively maintained

- Publicly available on GitHub
- User-friendly architecture (Camps & Baes 2015)
- Flexible suite of input models (Baes & Camps 2015)
- Actively developed by our research team in Ghent
- Interfaces with the output of hydrodynamical simulations
- Many built-in geometries, dust models, source spectra available

Simulation
Wavelength Grid
Stellar System
Geometry
Emission Spectrum
Dust System
Geometry
Dust Properties
Dust Grid
Instruments

GitHub

https://github.com/SKIRT/SKIRT

Pushing the limits in terms of features and performance

- Eternal forced scattering, continuous absorption (Baes et al. 2011) and composite biasing (Baes et al. 2016)
- Polarization by spherical and spheroidal particles (Peest et al., in prep.)
- Hybrid task and data parallelization (Verstocken et al., in prep.)
- Thermal emission by stochastic heating of small dust grains and polycyclic aromatic hydrocarbon molecules (Camps et al. 2015)
- Advanced 3D grid structures: hierarchical octree and k-d tree grids (Saftly et al. 2014) and unstructured Voronoi grids (Camps et al. 2013)

Post-processing hydrodynamical simulations
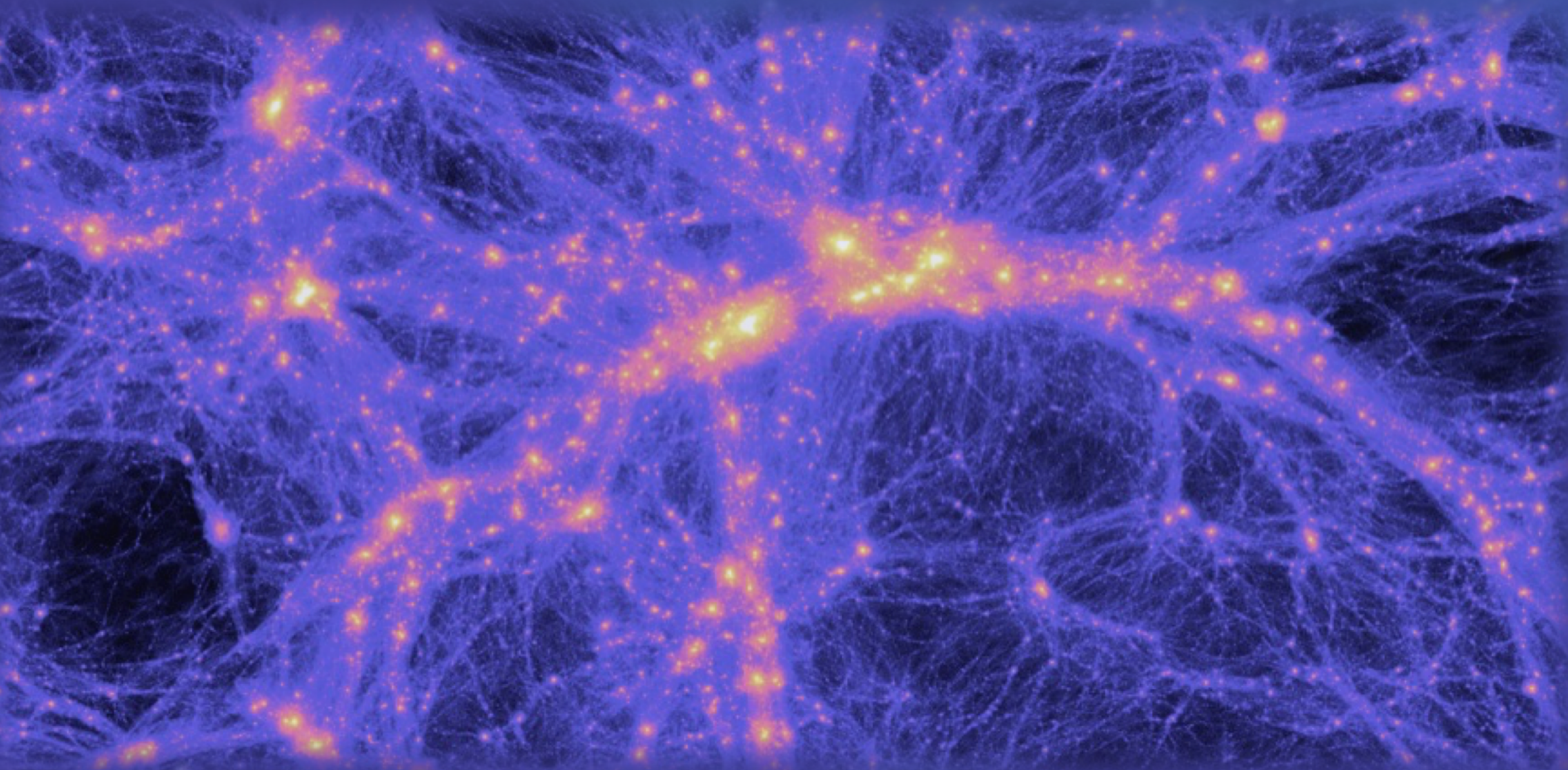
- Colours, luminosities and morphologies of EAGLE galaxies (Schaye et al. 2015; Trayford et al., in prep.)
- FIR-submm properties of EAGLE galaxies (Camps et al., in prep.)
- Mock observations of spiral galaxies to study the energy balance problem (Saftly et al. 2015)
- Synthetic observations of ripples in the Orion nebula modeled by gas+dust dynamics (Hendrix et al. 2015)

High-resolution 3D modeling of nearby spiral galaxies

- The Sombrero galaxy (De Looze et al. 2012)
- Whirlpool galaxy (De Looze et al. 2014)
- The nature of the UV halo around the spiral galaxy NGC 3628 (Baes & Viaene 2016)
- Andromeda galaxy (Viaene et al., in prep.)
- Bode's galaxy (Verstocken et al., in prep.)

Team: Prof. Maarten Baes, Flor Allaert, Peter Camps, Ilse De Looze, Marjorie Decleir, Gianfranco Gentile, Aleksandr Mosenkov, Christian Peest, Sam Verstocken, Sébastien Viaene