MontAGN - A 3D Radiative Transfer Code for the Modelling of Active Galactic Nuclei and Super Star Clusters

Tung Lam Nguyen*[1], Lucas Grosset[1], Daniel Rouan[1], and Damien Gratadour[1]

[1]Laboratoire d'Etudes Spatiales et d'Instrumentation en Astrophysique (LESIA) – Sorbonne Université

Paris 6, Observatoire de Paris, INSU, CNRS : UMR8109, Université Paris 7-Paris Diderot

5, place Jules Janssen 92190 Meudon, France

Abstract

We aim to present MontAGN (Monte Carlo for Active Galactic Nuclei), a 3-dimensional radiative transfer code developed in Python 2.7 for the modelling of active galactic nuclei (AGNs) and super star clusters (SSCs) emission in the near-infrared. In this code photons are propagated under the form of packets taking into account scattering, absorption, re-emission, temperature update and polarisation. Silicate, parallel and perpendicular graphite grains and several dust structures are supported, including radial, spherical power and hierarchically clumped density laws, clouds, shells, torus geometries and constant density cylinders. Other structures may also be defined by users. Polycyclic aromatic hydrocarbon (PAH) will be soon included. MontAGN is capable of constructing SEDs, maps and 3D visualisations from the output. It is also possible to use parallelisation with MontAGN. For the simulations of AGNs, we compared our results with the Monte Carlo radiative transfer code STOKES as well as observations of NGC 1068, a Seyfert 2 AGN. For the SSCs, we compared our results with the models calculated by Whelan et al. 2011. The code successfully reproduced major features, although several upgrades and improvements are still needed in the future.

*Speaker