**The mass-loss history from modelling 3D density distributions (#563)**

Claudia Agliozzo[1], Robert Nikutta[2], Giuliano Pignata[1], Neil Phillips[3], Adriano Ingallinera[4], Grazia Umana[4], Corrado Trigilio[4]

[1]Universidad Andres Bello, Santiago, Chile
[2]National Optical Astronomy Observatory, Tucson, USA
[3]European Southern Observatory, Santiago, Chile
[4]Istituto Nazionale di Astrofisica - OACT, Catania, Italy

The ejecta of evolved stars contain the fingerprints of the mass-loss phenomena suffered during their life. When the star is hot enough, the gas contained in the ejecta is ionised and emits free-free transitions over a large spectral domain. Radio observations are a useful tool to analyse this emission, since they do not suffer extinction due to interstellar dust. However, some of the parameters associated with the mass-loss, such the nebula mass, still have large uncertainties, due in part to arbitrary assumptions about the nebula geometry. In this talk I will present our new public code RHOCUBE, created to model 3D density distributions and determine, with a quantifiable and objective method, the nebula's geometric parameters via Bayesian inference. I will show how we applied the code to model the electron density distribution in the nebula associated with the candidate Luminous Blue Variable AL 418 (S 61) that we observed with ATCA at 5--23 GHz. We then use our 3D best-fit model to derive the mass-loss history in the nebula with high temporal resolution. In the specific case of S 61, we found that the nebula mass is an order of magnitude smaller than previous observations. Furthermore, the nebula was very likely formed through normal stellar winds subjected to the bi-stability jump, rather than LBV eruptions. RHOCUBE can be used for a range of applications and nebular geometries.