Contribution ID: **71** Type: **Talk**

Very massive stars do not expand: the uneventful life at the massive end of the IMF

Wednesday, 21 August 2024 12:00 (20 minutes)

Canonical stellar evolution models from both population synthesis and detailed evolutionary codes may predict Very Massive Stars (VMS, defined as $M_{\rm ZAMS}$ > 100 $M_\odot$) to become red supergiants and expand sometimes even more than 10,000 $R_\odot$. At those masses we now know that the luminosity levels are high enough for stellar envelopes to eject mass through winds at super-Eddington rates. This means that, already during the earliest evolutionary stages, VMSs behave like Wolf-Rayet stars and remain compact throughout their whole lifetime. We will show how this behavior has not only important consequences in isolated binary systems, where VMSs are consequently statistically incapable of initiating mass transfer events, but also in dense stellar systems, where the downsizing of VMSs up to three orders of magnitude can considerably affect the dynamical evolution of these environments. On top of that, having super-Eddington winds leads also to a drastically different picture in terms of the final black hole masses that VMSs can produce, which can further alter the structure of clusters.

Affliation

Nicolaus Copernicus Astronomical Centre of the Polish Academy of Sciences

Current Position

PhD Student

Primary author: ROMAGNOLO, Amedeo

Co-author: GORMAZ-MATAMALA, Alex (CAMK)

Presenter: ROMAGNOLO, Amedeo

Session Classification: Numerical approaches to modelling stellar systems and their constituents

Track Classification: Numerical approaches to modelling stellar systems and their constituents