Contribution ID: **92** Type: **talk**

Refining stellar evolution with the time-implicit hydrodynamic code MUSIC

Thursday, 21 September 2017 18:30 (15 minutes)

We present the latest developments and scientific results from the compressible, hydrodynamic, time-implicit code MUSIC. MUSIC uses a preconditioned Jacobian-free Newton-Krylov method to efficiently model stellar interiors in 3D without being hindered by high memory requirements. MUSIC has realistic opacity and equations of state and is suited to low- to moderate-Mach number flows (1e-6 < M < 1). This makes it a versatile tool for investigating a range of phenomena in stellar astrophysics. After summarizing recent code development and benchmarking, I will present results of our first studies: accretion on young objects, which affects their age and evolution in the HR diagram; and convection in various types of stars. A major motivation for our MUSIC work is to derive new prescriptions for stellar evolution codes and therefore improve models which are widely used in stellar and galactic astrophysics. Our first applications show successful developments in this direction.

Primary author: CONSTANTINO, Thomas (University of Exeter)

Presenter: CONSTANTINO, Thomas (University of Exeter)

Session Classification: Evolved stars and the connection to Galactic archaeology