



# Physics Colloquium



Thursday, Feb 16<sup>th</sup> at 3:30 pm in SC 234

**Dr. Craig Wheeler**  
*University of Texas at Austin*

## ***The Betelgeuse Project***

Betelgeuse appears to be rotating too rapidly. We have computed a suite of models with ZAMS masses from 15 to 25  $M_{\odot}$  in intervals of 1  $M_{\odot}$  including the effects of rotation with the stellar evolutionary code MESA. Incorporating the nominal observed rotational velocity,  $\sim 15$  km/s, yields significantly challenging constraints. In single star models, this velocity constraint is only matched when the models first approach the base of the red supergiant branch (RSB). Models at the tip of the RSB typically rotate at only  $\sim 0.1$  km/s. We summarize various options to account for the rotational velocity and suggest that one possibility is that Betelgeuse merged with a companion star of about 1  $M_{\odot}$  as it ascended the RSB, in the process producing the ring structure observed at about 7' away. A past coalescence would complicate attempts to understand the evolutionary history and future of Betelgeuse. We have done preliminary asteroseismological models to constrain the internal structure and have investigated the impact on the interior structure of the accretion of about 1  $M_{\odot}$  with Keplerian angular momentum corresponding to the current radius of Betelgeuse.

Refreshments at 3:00 pm in SC 103