

THE INFLUENCE OF ROTATION ON THE STRUCTURE
OF ZERO AGE MAIN SEQUENCE STARS

J. PETROVIĆ

Sterrenkundig Instituut Utrecht, The Netherlands
E-mail J.Petrovic@astro.uu.nl

Abstract. The influence of rotation and opacity on the structure of zero age main sequence (further on ZAMS) stars is investigated, along with the ZAMS displacement on the HR diagram due to the change of these two parameters. The models are made for the ZAMS stars ($X=0.75$, $Y=0.23$ and $Z=0.02$) with masses: 1, 1.2, 1.4, 1.6, 1.8, 2, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55 and $60M_{\odot}$ assuming rigid rotation with angular velocities from zero to some critical value. Two different opacity laws are applied, namely, the Kramers' (K models) and the Keller-Meyerott's (KM models). The models are obtained following the method of Kippenhahn & Thomas (1970).

It is shown that the value of the critical angular velocity depends on the stellar mass and the opacity. The maximum value is attained for stars $M \approx 1.5M_{\odot}$ and decreases with increase of the stellar mass. Stellar equatorial radius increases with angular velocity, while luminosity and effective temperature decrease.

Due to this effect, the position of ZAMS, with rotating models, is shifted on the HR diagram. It is also shown that the opacity influences the position of the ZAMS. Other effects of the rotation are the decrease of the central density for stars $M < 1.5M_{\odot}$ and the decrease of the central temperature for all masses. Hence, nuclear energy generation is lower in rotating stars.