

On the evolutionary status of Be stars. I. Field Be stars near the Sun

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A sample of 97 galactic field Be stars were studied by taking into account the effects induced by the fast rotation on their fundamental parameters. All program stars were observed in the BCD spectrophotometric system in order to minimize the perturbations produced by the circumstellar environment on the spectral photospheric signatures. This is one of the first attempts at determining stellar masses and ages by simultaneously using model atmospheres and evolutionary tracks, both calculated for rotating objects. The stellar ages (τ) normalized to the respective inferred time that each rotating star can spend in the main sequence phase (τ_{MS}) reveal a mass-dependent trend. This trend shows that: a) there are Be stars spread over the whole interval $0 \leq \tau/\tau_{\text{MS}} \leq 1$ of the main sequence evolutionary phase; b) the distribution of points in the $(\tau/\tau_{\text{MS}}, M/M_{\odot})$ diagram indicates that in massive stars ($M \geq 12M_{\odot}$) the Be phenomenon is present at smaller τ/τ_{MS} age ratios than for less massive stars ($M < 12M_{\odot}$). This distribution can be due to: i) higher mass-loss rates in massive objects, which can act to reduce the surface fast rotation; ii) circulation time scales to transport angular momentum from the core to the surface, which are longer the lower the stellar mass.

Reference: Astronomy and Astrophysics
Status: Manuscript has been accepted

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