[구ST-03] Pulsar Binary Birthrates with Spin-Opening Angle Correlations

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One ingredient in an empirical birthrate estimate for pulsar binaries is the fraction of sky subtended by the pulsar beam: the pulsar beaming fraction. This fraction depends on both the pulsar's beam geometry defined by the pulsar's opening angle and the misalignment angle between its spin and magnetic axes. The current estimates for pulsar binary birthrates are based on an average value of beaming fractions for only two pulsars, i.e., PSRs B1913+16 and B1534+12. In this work, we revisit the observed pulsar binaries to examine the sensitivity of birthrate predictions to different assumptions regarding the pulsar beam geometry. The results show that, for those pulsars without any direct beam geometry constraints, the estimated beaming correction factor is likely to be smaller than six, a canonically adopted value when calculating birthrates of Galactic pulsar binaries. The median birthrate estimates for pulsar-white dwarf and pulsar-neutron star binaries in the Galactic disk, based on the best observational constraints, are 34 per Myr and 89 per Myr, respectively.

[구ST-04] Search for extrasolar planets around K-giants: ε CrB - possible planet

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We report a possible low-mass companion around the K2 III star ε CrB (HD 143107). This star belongs to our sample of 55 K-giants studied for their radial velocity variations using the fiber-fed Bohyunsan Observatory Echelle Spectrograph (BOES) attached to the 1.8-m telescope at Bohyunsan Optical Astronomy Observatory (BOAO). Our precise radial velocity measurements were obtained from February 2005 to June 2010. We find an orbital solution with a period of P = 419 days, a semi-amplitude of K = 137 m/s, and an eccentricity of e = 0.14. Assuming a moderate stellar mass of $M_{\star}$ = 0.77 $M_{\odot}$, we calculate the minimum mass for the companion of m sini = 4.2 $M_{\rm Jup}$ with an orbital semi-major axis of 1.0 AU.