

## **A systematic reduction of Earth motion from radial velocity**

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The reflex motion caused by a star's companion would make the star's astrometry deviate from its system's astrometry. This deviation would make the radial velocity couple with the Earth motion, which could introduce systematic annually periodic error into radial velocity. We corrected the HARPS RVbank targets' Gaia DR3 astrometry data and their radial velocity data using PEXO and the proposed correction method. After correcting the bias in barycentric correction, the scattering of the radial velocity data of 111 targets is significantly decreased. In particular, we investigated two systems, 61 Virginis and Barnard's star, and significantly reduced the annual noise in the corresponding RV dataset.