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THE EFFECT OF CEPHEIDS EXHIBITTING BLENDING, BUMPS, ECLIPSES AND PERIOD CHANGES ON THE PERIOD-LUMINOSITY RELATION

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The study of structural breaks (non-linearity) on the Period-Luminosity relation began more than seven decades ago. Since then, some studies has found breaks in the Period-Luminosity relation. The objective in this work is to look for possible statistical causes of these breaks by means of robust techniques, instead of Ordinary Least Squares, to fit linear regression to OGLE-II and OGLE-IV data. These robust methods allow us to deal with influential points whose presence is a violation to the Ordinary Least Squares assumptions. In fact, fitting the models using M and MM-regressions, we do not find evidence to say that Period-Luminosity relation is non-linear in the LMC. Therefore, light curves of Cepheids suggesting blending, bumps, eclipses and period changes do not have an effect on the Period-Luminosity relation in this galaxy. On the contrary, for SMC, maybe, because of the geometry of the galaxy, there is a possible effect these stars and adequate models could not be found.

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SPECTRAL MONITORING OF ALPHA SCO

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During 2015 and 2016 the Astronomical Observatory of the Universidad de Los Andes in Bogotá, Colombia, has advanced a high-resolution spectral monitoring of Antares A. The observed radial velocity of this red supergiant has an average of -3 km/s but varies between zero and -6 km/s due to a complex pulsation pattern.

The aim of this project is to study these variations on all possible timescales. The observations will have to continue for several more years, because Antares' fundamental oscillation period is close to 2200 days. In the past, several teams of researchers have performed such monitoring of the same star, but our current project improves significantly in temporal resolution and coverage. During 2015 we secured 53 spectra on 27 nights; the year 2016 yielded 204 spectra recorded on 33 nights. The instrumentation is a 40 cm telescope and a spectrograph operated at a resolution of 31000. The precision of the radial velocity measurements is around 100 m/s. To date, findings include previously reported oscillations, and also rapid (millihertz) fluctuations whose amplitudes are correlated to the phase of the slower variations.

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