Work visit of an Indian colleague to Belgium

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Mrinmoy Sarkar (ARIES, India; PhD position funded by BINA in India; see picture) came to Belgium for a research visit of four weeks to work the asteroseismic study of the chemically peculiar (CP) δ Scuti pulsator HD118660 based on high-resolution spectroscopy, TESS photometry, modelling. During the first two weeks at the ROB, he collaborated with Peter De Cat and concentrated on the analysis of a time series of high-resolution spectra obtained in 2017 with the HERMES spectrograph that is attached to the 1.2-m Mercator@ORM telescope (La Palma, Canary Islands, Spain). It included the normalization of the spectra, determination of the radial velocities, and extraction of pulsation frequencies from the observed line-profile variations. Mrinmoy Sarkar spent the last two weeks of his visit at ULiège to work under the supervision of Marc-Antoine Dupret. They concentrated on the asteroseismic modelling of the pulsation frequencies extracted from the TESS short cadence light curve. The stellar evolution code CLÉS and the stellar pulsation code OSC were used to calculate the expected pulsation frequencies at each step of stellar evolution for models in a mass range compatible with the observed stellar parameters of HD118660. Subsequently, the observed frequencies were fitted with radial (degree $\ell = 0$) and dipole (degree $\ell = 1$) modes to find the best-fit parameters. In the corresponding model, the observed frequency with the highest amplitude ($f_1 = 30.9209 \pm 0.0001$ d^{-1}) does not correspond to the fundamental radial mode but with the radial overtone with $n = 5$. The initial results of this project were presented immediately after this visit as a poster during the 3rd BINA workshop [Sarkar et al., 2024, "Amplitude Modulation in a delta Scuti star HD 118660", Bulletin de la Société Royale des Sciences de Liège 93(2), 285]. Afterwards, the work on the asteroseismic modelling of the TESS frequencies continued and the resulting paper was submitted to MNRAS in September [Sarkar et al., 2024, "Asteroseismology of the Am δ Scuti star HD118660: TESS photometry and modelling", Monthly Notices of the Royal Astronomical Society, 534, 3211 (impact factor 2023: 4.7)].