

Imaging polarimetry of the dust coma of Comet C/2013 V1 (Boattini) and Comet 290P/Jager

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We present the optical imaging polarimetric observations of comets C/2013 V1 (Boattini) and Comet 290P/Jager at lower phase angles with the 1.04-metre Sampurnanand telescope of Aryabhata Research Institute of Observational Sciences (ARIES) near Nainital in India on 4th & 5th of December, 2013 and on 24th April, 2014 using R photometric band ($\lambda = 630$ nm, $\Delta\lambda = 120$ nm). The observations were conducted in both the pre and post perihelion passage of two comets. The degree of polarization changes from $(-1.4 \pm 0.3)\%$ to $(+2.8 \pm 0.5)\%$ for Comet C/2013 V1 (Boattini) and $(-1.6 \pm 0.5)\%$ to $(+2.5 \pm 0.5)\%$ for Comet 290P/Jager at phase angles $\sim 13^\circ$ and 27° respectively. The intensity profile of both the comets shows the asymmetric nature of the cometary coma. The variation of slopes along sunward and antisunward direction explores the various physical evolution going in the cometary coma. The deviation of the brightness profile in the solar and antisolar direction from the standard canonical nature confirms the time variable dust outflow which is mainly due to the modulation of dust production rate, sublimation of high albedo icy grains due to the solar radiation pressure and variation in the physical properties of dust. It has been noticed from polarization maps that the polarization is highly negative in the circumnucleus halo of Comet 290P/Jager as compared to that of Comet C/2013 V1 (Boattini) during December observation while a high positive polarization is being observed at the near nucleus region of both the comets in April observation.