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Polarized light from tidal disruption events: observations and modelling

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Polarimetric observations of tidal disruption events (TDEs) have been very scarce until now, with most measurements conducted for relativistic (jetted), or otherwise extraordinary, TDEs. I will present the first results from a program at the VLT, focusing on spectral polarimetry of optical (thermal) TDEs. After appropriate corrections, the continuum polarization appears constant with wavelength. The core of broad emission lines are depolarized, but polarization peaks are sometimes present at the wings of the lines. Our observations suggest that the origin of polarization in optical TDEs is electron scattering. Contribution from synchrotron is ruled out, while dust polarization is unlikely. Polarization decreases with time and the system becomes closer to axial symmetry, which we suggest is evidence for rapid disk formation. We model the polarization properties for a unification model for TDEs, based on a super-Eddington accretion disk and the radiative transfer code POSSIS, and find polarization levels that are consistent with the observations. The same methodology is also applied to the collision-induced outflow model. Spectral polarimetry of TDEs combined with adequate modelling can therefore shed light on the nature of optical emission from these transients.

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