## M10b High-time resolution physics in stellar flares from a 7-day multi-wavelength campaign on young planet-hosting M dwarf flare star AU Mic

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M dwarfs are considered one of the best targets of exoplanet surveys, but they have intense flaring events, which could negatively impact the habitability of exoplanets. Our current understanding of the multi-wavelength properties of M dwarf flaring events is surprisingly far from complete both in wavelength coverage and temporal resolution. To rectify this, our team conducted multi-wavelength (e.g., X-ray/NUV/optical/radio) campaign of the dM1e flare star AU Mic over 7-days (Oct 10 - 17, 2018), with a large fleet of ground and space-based observatories, including XMM-Newton, Swift, VLA, ATCA, SMARTS 0.9m & 1.5m, APO 3.5m, and LCOGT. AU Mic itself is also becoming famous since a Neptune-size exoplanet was recently reported (Plavchan et al. 2020). We present high time-resolution light curves, flare correlations across the spectrum, and discuss the Neupert effect (i.e. the X-ray derivative peak and NUV/optical peak timings overlap) among the X-ray, UV, and optical response in $\sim$22 flares. We find that the Neupert effect is not necessarily present in all of our flares. We also investigate how flaring H$\alpha$ & H$\beta$ line profiles have a correlation with NUV/optical continuum and soft X-ray responses, which can be good constraints on the heating process of flaring atmosphere (cf. Namekata et al. 2020). Quiescent emissions in X-ray and H$\alpha$ also show possible rotational modulations and could be helpful to investigate the active region distribution of active stars (cf. Toriumi et al. 2020; Takasao et al. 2020).