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Studies of low temperature photoluminescence spectra and excitonic valley polarization in monolayer MoTe2 SANDHAYA KOIRALA, SHINICHIRO MOURI, YUHEI MIYAUCHI, KAZUNARI MATSUDA, Kyoto Univ - Uji Campus, KYOTO UNIVERSITY TEAM — Recently, atomically thin layered transition-metal dichalcogenide (TMDs) in the form MX_2 (M = Mo, W, X = S, Se, Te) have attracted much interest from the viewpoints of their fundamental physics and potential applications [1, 2]. The characteristic optical features of semiconducting TMDs arise from excitons confined in their atomically thin layers. Molybdenum ditelluride $MoTe_2$ has attracted emerging research interest because of optical gap energy (lowest exciton transition) of 1.09 eV, and large spin-orbit coupling of 250 meV. Temperature-dependent photoluminescence (PL) and polarization-resolved PL measurement were performed for mechanically exfoliated monolayer $MoTe_2$ from 4.4 to 300 K. At a low temperature, the PL spectra from $MoTe_2$ show two sharp peaks for excitons and charged excitons (trions). The systematic temperature-dependent PL measurements revel that the homogeneous linewidth of the exciton peak broadens linearly as the temperature increased due to exciton–acoustic-phonon interactions [3]. From polarization-resolved PL measurements, the valley polarization of above 40 % in the exciton state has been observed at low temperatures. In this meeting, we will discuss about exciton dephasing and valley polarization in monolayer MoTe2. [1] D. Kozawa, K. Matsuda, G. Eda et al., Nat. Commun. 5, 4543 (2014). [2] S. Mouri, Y. Miyauchi and K. Matsuda, Nano Lett. 15, 2336 (2015). [3] S. Koirala, K. Matsuda et al., submitted for publication.

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