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Electrodynamics and electronic structure of LVO/SVO superlattices investigated by optical spectroscopy DA WOON JEONG, Seoul National Univ., Korea, WOO SEOK CHOI, TAE DONG KANG, Seoul National Univ, DAVID ADRIAN, CNRS, France, YUN SANG LEE, Soongsil Univ., Korea, WILFRID PRELLIER, CNRS, TAE WON NOH, Seoul National Univ — Perovskite vanadium oxide has intriguing coupling between orbital, spin and lattice degrees of freedom that bears novel physical properties. For example, filling controlled insulator to metal transition could be observed in $(La_{1-x}Sr_x)VO_3$, and orbital ordering was predicted theoretically for the interface valence state ($V^{3.5+}$) between $LaVO_3$ and $SrVO_3$ [1]. Here, we investigated the charge dynamics and electronic structures of $(LaVO_3)_{6m}(SrVO_3)_m$ (m=1,2, and 4) superlattices using optical spectroscopy. We found a reduction of Drude spectral weight as the superlattice periodicity is decreased, consistent with the transport result [2]. Moreover, interband transition of $(LaVO_3)_6(SrVO_3)_1$ was quite different from other larger period superlattices. New peak structure at 3.5eV was developed possibly due to the correlation between the electronic structure and orbital confinement. Electrodynamics and electronic structure reconstruction will be discussed.

[1] G. Jackeli *et al.*, PRL, **101**, 216804 (2008)
[2] W. C. Sheets *et al.*, APL **91**, 192102 (2007)

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