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Two dimensional valley electrons and excitons in the noncentrosymmetric 3R MoS2 RYOSUKE AKASHI[1], MASAYUKI OCHI, Riken Center for Emergent Matter Science, Japan, SANDOR BORDACS, Budapest University of Technology and Economics, Hungary, RYUJI SUZUKI, The University of Tokyo, Japan, YOSHINORI TOKURA, Riken Center for Emergent Matter Science, Japan, YOSHIHIRO IWASA, The University of Tokyo, Japan, RYOTARO ARITA, Riken Center for Emergent Matter Science, Japan — Possible control of the valley-dependent spin polarization in transition-metal dichalcogenides has been a hot topic as the valleytronics. Through the recent great progress based on the monolayer systems, people's interest is shifting to multilayered polytypes. The centrosymmetric 2H-stacked systems have been much studied for switching of the valley-dependent spin polarization. On the other hand, some of the authors [Suzuki et al., Nat. Nanotechnol. 9, 611 (2014)] have successfully fabricated the noncentrosymmetric 3R-stacked MoS2 multilayer and demonstrated the valley polarization independent of the number of layers. On the basis of this success, we further examined the valley electronic states in the 3R-MoS2 and found their novel two-dimensional properties utilizable for the valleytronics [Akashi et al., submitted.]. Namely, interlayer hopping of the valley electrons was proved to be zero as a consequence of a quantum-interference effect caused by the 3R-stacking geometry. In the talk, we report the results of the reflectivity measurement and analysis with an anisotropic hydrogen atomic model and show that the zero hopping causes 2D-hydrogen-like spectral series and confinement of the wave function within a single layer of the valley exciton.

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