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Optical investigations on spin density wave instability in $SrMnBi_2$

HYUN-JU PARK, DA WOON JOENG, CHANG HEE SOHN, CFI-CES, Institute for Basic Science, and Department of Physics & Astronomy, Seoul National University, Seoul 151-747, Korea, JOONBUM PARK, J.S. KIM, Department of Physics, Pohang University of Science and Technology, Pohang 790-784, Korea, K.W. KIM, Department of Physics, Chungbuk National University, Cheongju 361-763, Korea, S.J. MOON, Department of Physics, Hanyang University, Seoul 133-791, Korea, T.W. NOH, CFI-CES, Institute for Basic Science, and Department of Physics & Astronomy, Seoul National University, Seoul 151-747, Korea — We investigated the electronic response of layered transition metal pnictide SrMnBi2 using infrared spectroscopy. SrMnBi2 has a crystal structure similar with that of Fe-based superconductors and shows antiferromagnetic order at high temperature 290 K. We observe that the onset of antiferromagnetic order induces a partial gap formation. Upon entering the antiferromagnetic state, the Drude response is drastically suppressed and the spectral weight is transferred to higher energies. Our results suggest that the antiferromagnetism in SrMnBi2 may be associated with spin-density-wave instability of itinerant carriers. We will discuss possible origins of the density-wave-instability based on the first-principles-calculation results.

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