Abstract Submitted
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Observation of the room-temperature local ferromagnetism and its nanoscale growth in the ferromagnetic semiconductor GeFe[1] Y. K. WAKABAYASHI, S. SAKAMOTO, The Univ. of Tokyo, Y. TAKEDA, JAEA, K. ISHIGAMI, Y. TAKAHASHI, Y. SAITOH, The Univ. of Tokyo, H. YAMAGAMI, JAEA, A. FUJIMORI, M. TANAKA, S. OHYA, The Univ. of Tokyo — Group-IV-based ferromagnetic semiconductor GeFe is expected to be efficient spin injectors and detectors in group-IV-based semiconductor devices, because it can be epitaxially grown on Si and Ge substrates [1,2] and the T_C can be increased up to 210 K by annealing [3]; however, detailed microscopic understanding of the ferromagnetism is lacking. In this study, we have investigated the local magnetic properties of the GeFe films, using soft X-ray magnetic circular dichroism. We found that nanoscale local ferromagnetic regions formed in the high-Fe-content regions exist even at room temperature, well above the Curie temperature of 20 - 100 K. We also observed the intriguing nanoscale growth process of the local ferromagnetic regions in which they expand as temperature decreases, followed by a transition of the entire film into a ferromagnetic state at the Curie temperature [4]. References [1] Y. Ban, Y. Wakabayashi et al., AIP Adv. **4**, 097108 (2014). [2] Y. K. Wakabayashi et al., Phys. Rev. B, **90**, 205209 (2014). [3] Y. K. Wakabayashi et al., J. Appl. Phys. **116**, 173906 (2014). [4] Y. K. Wakabayashi et al., arXiv:1502.00118 (2015).

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