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Local structure and electronic properties of some emerging BiS2-based materials

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A wide variety of emerging functional materials reveal their physical properties determined by electronic inhomogeneities appearing at varying length scales. Here, some of our recent studies using extended x-ray absorption fine structure (EXAFS) and space resolved photoemission on self-doped BiS_2-based superconducting systems will be presented. Space resolved photoemission shows metallic phase embedded in the stoichiometric $CeOBiS_2$ and $EuFBiS_2$. While bulk of the sample is semiconducting, the embedded metallic phase is characterized by the Fermi surface similar to the one of doped metallic BiS_2-based materials. The results will be discussed in connection with peculiar local structure with axial Bi-S atomic displacements being important for the self-doping.

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