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Bipartite bosonic modes and magnetic memory effects in superconducting $Sr_4V_2O_6Fe_2As_2$ JHINHWAN LEE, SEOKHWAN CHOI, HYUN JUNG LEE, KAIST, Physics Dept., WON-JUN JANG, KAIST, Physics Dept., IBS CAPP, JONG MOK OK, POSTECH, Physics Dept., HYUN WOO CHOI, JIN OH JUNG, DONG HYUN SON, KAIST, Physics Dept., HWAN SOO SUH, SAIT, YANNIS SEMERTZIDIS, KAIST, Physics Dept., IBS CAPP, JUN SUNG KIM, POSTECH, Physics Dept. — Using a homemade variable temperature high field spin-polarized STM, we have performed spectroscopic-imaging STM measurement on the parent-state superconductor $Sr_4V_2O_6Fe_2As_2$ with each unit cell composed of superconducting FeAs layer sandwiched by two nearly Mott-insulating Sr_2VO_3 layers. The hybridization between the localized V electrons and the itinerant Fe electrons causes electron transfer to the FeAs bands and generates a Gamma-centered electron pocket, as well as a Fano resonance at -18 meV with signature of Fano lattice. In the QPI measurement, we observed two distinct bosonic modes, i.e. the kinks and the partial replicas of the QPI dispersion with characteristic mode energies around 14 meV and 20 meV respectively, which agree with the self-energies due to two distinct electron-boson mode coupling functions in Migdal approximation. In spin-polarized STM mode, we observed atomic scale magnetic memory effect of the V atoms controlled with low energy (around 50 meV) spin-polarized tunneling current and used it to reveal underlying magnetic domains in the FeAs layer. Variable temperature spin-polarized STM measurements on some known antiferromagnetic materials will also be presented and discussed.

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