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Impurity Dimer Scattering as Reflection of Band Reconstruction in Iron Pnictides[1] JIAN KANG, ZLATKO TESANOVIC, Institute for Quantum Matter, Johns Hopkins University — While the impurity induced nanoscale electronic disorder has been extensively reported in the underdoped iron pnictides its microscopic origin remains a theoretical challenge. Recent STM measurements reveal a resonance in the impurity dimer scattering in cobalt-doped iron arsenides. These resonant dimers are randomly distributed but aligned with antiferromagnetic a-axis. We present a theoretical study of the impurity induced quasiparticle interference patterns in these materials, based on the five orbital model. The local density of states oscillates with the "imperfect nesting" wavevector encoded in the reconstructed Fermi pockets, provided one assumes the ordered pocket density wave (PDW) state along the b-axis. This anisotropic oscillation pattern breaks C_4 symmetry and is in agreement with the electronic dimmer resonance found in the STM experiments, hinting at the existence of "hidden" PDW order in iron-based superconductors [1]. [1] J. Kang and Z. Tesanovic, Phys. Rev. B 83, 020505(R) (2011).

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