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Magnetic field dependence of the density of states and tilted vortex lattice in the superconductor β-Bi_2Pd EDWIN HERRERA-VASCO, ISABEL GUILLAMON, ANTON FENTE, Universidad Autonoma de Madrid, JOSE GALVIS, Universidad Central, ALEXANDRE CORREA, ROBERTO LUCCAS, FEDERICO MOMPEAN, MAR GARCIA HERNANDEZ, Instituto de Ciencia de Materiales, Consejo Superior de Investigaciones Cientificas, JEAN P. BRISON, Universite Grenoble Alpes, CEA, INAC-SPSMS, SEBASTIAN VIEIRA, HERMANN SUDEROW, Universidad Autonoma de Madrid — We present very low-temperature scanning tunneling microscopy (STM) experiments on the superconductor β-Bi_2 Pd. We find a single superconducting gap from the zero-field tunneling conductance. We also find that the hexagonal vortex lattice is locked to the square atomic lattice. The magnetic field dependence of the intervortex tunneling conductance is higher than the one expected in a single-gap superconductor. Such an increase in the intervortex tunneling conductance has been found in superconductors with multiple superconducting gaps. We fit the upper critical field H_{c2}(T) and show that multiband Fermi surface is needed to explain the observed behavior. We propose that β-Bi_2Pd is a single-gap multiband superconductor. We have measured the tilted vortex lattice (TVL) using a three axis superconducting magnet. Our results give first real space imaging of the TVL in a nearly isotropic s-wave BCS superconductor. From a detailed study of the TVL varying polar and azimuthal angles, we find correlations between the square atomic lattice and the TVL.

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