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Fluctuation conductivity in superconducting MgB2

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Abstract

According to the crystal structure of MgB2 and band structure calculations, quasi-tw--dimensional (2D) boron planes are responsible for the superconductivity. We report on critical-field and resistance measurements of 5.6-μm-thick MgB2 films grown on a sapphire single-crystal substrate. Resistivity measurements yield a temperature dependence of the fluctuation conductivity above the critical temperature, which agrees with the Aslamazov-Larkin and Maki-Thompson theory of fluctuations in layered superconductors, indicating a quasi-two-dimensional nucleation of superconductivity in MgB2. © 2002 MAIK "Nauka/Interperiodica".

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