

Abstract Submitted
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Giant enhancement of superconductivity in ultrathin *a*-Pb films by a parallel magnetic field: effect of film thickness H. J. GARDNER, L. YU, A. KUMAR, P. XIONG, Florida State University — We have observed a pronounced enhancement of superconductivity in ultrathin homogeneously disordered amorphous Pb films in the presence of a parallel magnetic field. Our experiments are carried out in a modified dilution refrigerator capable of *in situ* film growth and sample rotation, thus allowing for a detailed examination of the effects of perpendicular and parallel magnetic field on the same film at incrementally larger thicknesses. With increasing thickness, the film is tuned from an insulator to a superconductor where its zero-field T_c increases with the thickness. For these films we observe enhancement of T_c by a parallel magnetic field, while a perpendicular magnetic field of any strength causes a degradation of T_c . The magnitude of the T_c enhancement appears to exhibit a non-monotonic dependence on the film thickness (zero-field T_c). The enhancement is as large as 13% and persists in fields as high as 8 T for certain thicknesses. We will discuss the possible origin of the field-enhancement of superconductivity.

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