

Vortex matching effects in Nb thin films due to Ni nanopillars embedded in anodic aluminum oxide substrates

M Trezza¹, C Cirillo¹, A I Vorobjeva², E A Outkina², S L Prischepa² and C Attanasio¹

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Author e-mails

attanasio@sa.infn.it

Author affiliations

¹ CNR-SPIN and Dipartimento di Fisica 'E. R. Caianiello', Università degli Studi di Salerno, Fisciano (Sa) I-84084, Italy

² Belarusian State University of Informatics and RadioElectronics, P. Brovka Street 6, Minsk 220013, Belarus

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Abstract

We describe a simple method for obtaining a dense array of ferromagnetic (Ni) nanowires in robust anodic aluminum oxide (AAO) templates. The superconducting properties of Nb thin films subsequently deposited on these structures show an enhancement of the upper critical magnetic field as well as increase of the superconducting critical temperature in correspondence to the magnetic matching fields in the H–T phase diagram.