

TUNNELING INDUCED
MAGNETIZATION IN THE NORMAL
METAL/FERROMAGNET SANDWICH

S.E. Shafranjuk

Department of Physics and Astronomy,
Northwestern University
(Evanston 60208, USA),
Institute of Magnetism, Nat. Acad. Sci. of Ukraine
(36b, Academician Vernadsky Blvd., Kyiv 03142,
Ukraine; e-mail: sergei@imag.kiev.ua)

S u m m a r y

Tunneling magnetization mechanisms in the N/F sandwich where N is a normal metal and F is a ferromagnet are considered. Nonlinear equations describing the magnetic properties of N and F are obtained using the Keldysh—Green function approach. The equations include self-consistency equations for the intrinsic molecular fields \mathbf{h}_N and \mathbf{h}_F completed by the kinetic equation for the spin imbalance distribution function $f_{2,\varepsilon}$. We examine: (i) the proximity magnetization caused by a direct tunneling interaction and (ii) the nonequilibrium spin imbalance magnetization. The set of nonlinear equations has multiple solutions, which are interpreted as magnetization domains induced by the spin-polarized tunneling when the bias voltage V across the N/F sandwich is applied.