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Magnetostatic interaction between two thin nanotubes¹ EUGENIO E. VOGEL, Universidad de La Frontera, Temuco, Chile, OMAR SUÁREZ, PATRICIO VARGAS, Universidad Santa María, Valparaiso, Chile — We consider here the magnetic interaction between two identical tubes, characterized by: total magnetization M , length $2L$, external radius R_e , internal radius R_i . Following most of the experimental realizations we consider very thin tubes, namely, $(R_e - R_i) \ll R_i$. We begin by considering the two nanotubes in perfect parallel alignment and we vary the separation distance D . The continuous magnetization approach is invoked using different methods to compute the interacting energy: analytic expression valid for $D < 2L$, analytic integration over the interaction of elements on each tube, and numeric integration for general cases. These results are compared with two independent results: a) the tubes are far apart so they can be considered solid nanowires: b) each tube is considered as a set of elementary nanowires and a series expansion is obtained and truncated. The advantages and disadvantages of each method are discussed. The ranges of applicability of the “handy” approximate expressions are obtained.

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