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## **FLOW PATTERNS IN THE MAGNETIC NANOFUID CORE OF A MINIATURE PLANAR SPIRAL TRANSFORMER**

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### **Abstract**

This paper analyses mathematical models and numerical simulation results for a notional miniature, planar, spiral transformer (MPST) fabricated in MEMS technology, for galvanic separation, proposed to equip an electric harvesting device (EHD). Two types of core – ferrite and (partially) magnetic nanofluid – are considered. We found that magnetization body forces occur in the super-paramagnetic nanofluid core and they result in complex, steady state flows consisting of fully 3D recirculation cells.

*Key words:* energy harvesting device, fluid flow, magnetic nanofluid core, magnetic forces, numerical simulation, planar spiral miniature transformer

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