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Finite-element modeling of thermal and condensed magnon transport ROBERTO MYERS, ZIHAO YANG, The Ohio State University — Understanding the interaction between spin and heat fluxes is crucial to uncover the physics of existing spin caloritronic phenomena and to predict new ones. Along these lines, Flebus et. al. proposed that a magnon Bose-Einstein condensate (BEC) would form in an easy-plane magnetic insulator in the presence of a thermal gradient [1]. That theory used hydrodynamic transport equations for spin and heat which can be solved using finite-element method (FEM). Here, we use FEM to solve the normal magnon and heat transport equations with and without magnon condensation in a Pt/YIG/Cu structure [1]. First, the effect of a heating laser on normal magnons is modeled. The magnon spin current decays away from the laser heating source. The modeled decay and its temperature dependence are compared to the recent non-local spin transport studies in YIG[2][3]. The heating laser is shown to induce a magnon BEC along with the normal magnons. The BEC velocity, condensed magnon current, and condensate frequency are calculated as a function of temperature and magnetic field. This work is supported by ARO MURI W911NF-14-1-0016. [1]Flebus et. al. PRL, 116, 117201 (2016) [2]Giles et. al. PRB 92, 224415 (2015) [3]Cornelissen el. al. PRB 94, 180402(R) (2016)

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