Learning phase transitions in amorphous ferrimagnets

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(Dated: September 1, 2020)

We identify phase transitions in weak amorphous ferromagnets using machine learning technique, which is based on the learning with confusion. We test the suggested method on the basis on the analytic model for the dynamics of domain walls in weak ferromagnets and obtain that corresponding universal W-shape. Then we discuss the application of such a method for the case of amorphous ferrimagnets, where parameters of the model may fluctuate. Special attention is paid to the case of GdFeCo, which is a metallic ferrimagnet with compensation point that is one of the most promising materials in ultrafast magnetism.

Machine learning techniques as a data analysis tool has been proven it's efficiency in numerous research areas during the last decade. The reason of such popularity is the core idea behind all the employed methods – inherent data pattern recognintion, that is an important part of scientific activity. Physics is no exception since many of it's ideas lies in the foundation of the current machine learning approaches.

[1] Evert P.L. Van Nieuwenburg, Ye Hua Liu, and Sebastian D. Huber. Learning phase transitions by confusion. *Nature Physics*, 13(5):435–439, 2017.