

Bio:

Ezio Iacocca received his PhD in Physics from the University of Gothenburg with Prof. Johan Åkerman in 2014. He then did a postdoc with Prof. Mark Hoefer at CU Boulder in the Applied Mathematics department where he studied nonlinear waves in continuum magnetic media. In 2019 he became a Senior Lecturer at Northumbria University in Newcastle, UK where his research was devoted to ultrafast magnetism and spin waves in artificial spin ices. He started a faculty position at UCCS this fall.

Title: Spin waves and magnetic solitons: between theory and experiments

Abstract: Spin waves are excitations of an ordered magnetic system. A fundamental question that arises is whether such waves are stable or not. It turns out that in certain magnetic materials, spin waves are stable and one can study their dispersion and control towards applications. In other magnetic materials, spin waves are unstable, typically leading to the formation of magnetic solitons, that is, spatially localized bound states. In this talk, I will discuss my research in both contexts from a primarily theoretical perspective but strongly influenced by experimental results. First, I will discuss spin waves in artificial spin ices and the next steps to keep up with the experiments. Second, I will discuss the nucleation of magnetic solitons due to ultrafast (20 femtosecond) excitations, the main numerical challenges, and opportunities going forward in the field.