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Manipulating Modes in Mulitmode Fibres with Magnets

Tuesday 8 July 2025 15:00 (20 minutes)

The Faraday Effect, a magneto-optic phenomenon, causes the rotation of linearly polarised light when subjected to a magnetic field along the direction of propagation. In magneto-optic materials like multimode fibres, where different spatial modes interfere to form complex speckle patterns, could these modes be influenced by applying an external transverse magnetic field to the multimode fibre? By utilising different fibre types, including single-mode and step-index multimode fibres, and employing a physics-informed neural network (PINN) to reconstruct the transmission matrix under a magnetic field, we experimentally demonstrate a mode-dependent Faraday Effect in multimode fibres, a new and unexpected result.

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