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## Formation of cobalt/garnet heterostructures and their magnetic properties

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## Abstract

In this paper we report the use of ion beam sputtering to form Co/garnet heterostructures with a sub-nanometer roughness parameter at the interface. Prior to the ultrathin Co layer deposition, garnet films are thinned to a thickness range of 6.5  $\mu\text{m}$  to 1  $\mu\text{m}$  by oxygen ion beam sputtering with a low energy regime. The magnetic properties and magnetic anisotropy of the Co/garnet heterostructures are measured by both magneto-optical magnetometry and ferromagnetic resonance. We have shown that Gilbert damping of the Co layers on the garnet films is comparable to the damping of single layer polycrystalline Co grown on metallic under-layers.

## Highlights

- we report a damage-free method for surface modification in garnets
- tuning the garnet thickness by etching using ion beam sputtering
- we measured the magnetic anisotropy in Co/garnet heterostructures
- Gilbert damping in the Co films on a garnet films was obtained

Keywords garnet film; cobalt; magneto-optics; domain structure; magnetic anisotropy

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