

# The Influence of Magnetic Field Applied on Fiber Bragg Gratings

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**Abstract.** The paper demonstrates novel magnetic optical fiber Bragg grating (FBG) sensors based on magnetostriction material Terfenol-D and ferrofluids. The FBG is an optical fiber with inscribed refractive index modulation. The modulation causes that a narrow wavelength bandwidth of wide bandwidth input spectrum is reflected. Due to attached material, such as Terfenol-D or ferrofluid, the reflected wavelength changes with applied magnetic field. The magnetic FBG sensor consists of a small bar of magnetostriction alloy TbDyFe, also known as Terfenol-D, which has the largest magnetostriction of any known material. The FBG is glued on the Terfenol-D bar with a UV-glue. Consequently, magnetic field is applied to the sensor. The FBG sensor based on ferrofluid is also demonstrated. Ferrofluid is liquid made of ferrimagnetic particles suspended in water or oil. This ferrofluid is injected into a small capillary tube with an etched FBG. Ferrofluids change their refractive index with applied magnetic field.