# Stand-Off Magnetometry with Directional Emission from Sodium Vapors

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Stand-off magnetometry allows measuring magnetic field at a distance and can be employed in geophysical research, hazardous environment monitoring, and security applications [1]. Stand-off magnetometry based on resonant scattering from atoms or molecules is often limited by the scarce amounts of detected light [2]. The situation would be dramatically improved if the light emitted by excited atoms were to propagate towards the excitation-light-source in a directional manner. Here, we demonstrate that this is possible by means of mirrorless lasing [3]. In a tabletop experiment, we detect free-precession signals of ground-state sodium spins under the influence of an external magnetic field by measuring backward-directed light [4]. This method enables scalar magnetometry in the Earth field range that can be extended to long-range remote sensing.

**References**

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