



Space qualification of a new scalar magnetometer

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The Coupled Dark State Magnetometer (CDSM) is an optically-pumped absolute scalar magnetometer which is based on two-photon spectroscopy of free alkali atoms. In a special laser based excitation mode, three different magnetic field dependent resonances arise in the presence of an external magnetic field. They reach their maximal strengths at different angles between the magnetic field direction and the reference axis of the sensor which is defined by the optical path of the laser excitation field. Dependent on this angle the strongest resonance is selected for the actual measurement which enables an omni-directional scalar magnetometer with an uncomplicated sensor design (e.g. no moving parts, feedback coils and active electronics at the sensor). A further advantage of this measurement principle is the high dynamic range of more than 6 decades.

The technology readiness level of the CDSM is 5 at the moment and it shall reach level 6 (qualification model) by the end of 2013.

The presentation includes the measurement principle, the technical realization of a space qualified setup, results of performance measurements and a discussion of its radiation hardness.