Abstract Submitted
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Development of an 8-12 GHz variable frequency microwave resonant cavity for optically-detected magnetic resonance (ODMR) of GaAs-related semiconductors J.S. COLTON, L.R. WIENKES, L.R. OESTREICH, P.M. SCHROEDER, University of Wisconsin-La Crosse — In order to do spin echo measurements of the T2 spin coherence time in GaAs and related materials, one must have a resonant microwave cavity; the resonance serves mainly to increase the strength of the magnetic field at the sample. In order to probe materials with g-factors as low as $|g| = 0.1$ (such as quantum-confined GaAs samples, and bulk/quantum-confined AlGaAs alloys) in moderate magnetic fields (< 7 T), we have selected a resonant frequency of around 10 GHz for the resonator design. In order to fit a 10 GHz cavity into moderately-sized (< 1 inch) magnet bore, however, a high dielectric material must be used, a so-called "dielectric resonator". We will present the design and testing of such a resonant cavity (resonant mode: TE011), that additionally allows for optical access of the sample, as well as a highly-variable resonant frequency.

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