Abstracts

An Ultra-High Quality Factor Microwave Sapphire Loaded Superconducting Cavity Transducer

B.D. Cuthbertson, M.E. Tobar, E.N. Ivanov and D.G. Blair. "An Ultra-High Quality Factor Microwave Sapphire Loaded Superconducting Cavity Transducer." 1996 MTT-S International Microwave Symposium Digest 96.3 (1996 Vol. III [MWSYM]): 1489-1492.

The performance of a prototype ultra-high quality factor (Q > 10/sup 8/) Sapphire Loaded Superconducting Cavity Transducer (SLSCT) operating at X-band is described. The measured displacement noise floor of 3.0±0.6x10/sup negative 16/m/spl rudic/Hz (~2x10/negative 11/g//spl rudic/Hz) at 1 kHz was an order of magnitude better than a similar room temperature transducer, and several orders of magnitude better than current commercially available accelerometers. Improvements in the transducer's microwave system should enable the noise floor to be lowered by several orders of magnitude. An electromagnetic model of the transducer has also been developed which permits the tuning coefflcient, and hence the displacement sensitivity to be accurately predicted.

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