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Broadband transducers for underwater communications

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Properties of underwater acoustic cylindrical piezoelectric (PZT) transducers currently used for broadband underwater communications with unmanned underwater vehicles (UUV) and new transducers under development utilizing single crystal relaxor ferroelectrics (PMN-PT) with significantly higher material coupling coefficients and lower sound speed are presented. Characteristics including resonance frequency, coupling coefficient, transmit (TVR) and receive (OCVS) frequency response, maximum drive and achievable source levels, tuned and untuned power factor, and directivity factors are discussed. Results for experimental calibrations and field tests will be compared with detailed equivalent electrical circuit models of the transducer and transducer channel. Work supported in part by BTech Acoustics and Office of Naval Research.