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## Optimization of near-field acoustic sensing in a SANM system

In Shear-force Acoustic Near-field Microscopy, the sensitivity of the acoustic detection system is crucial to reliably characterize the dynamic response of fluids subjected to confinement and shear stress. Herein we report a method to increase the signal-to-noise ratio of the amplification system, as reflected in approach/retraction test undertaken using a SiO<sub>2</sub> sample and a silicon pyramid probe. In this method the inherent capacitance present in the acoustic sensor system (a pile of piezoelectric plates) is matched with a parallel inductor forming a tank circuit optimizing the signal at a desired operating frequency ~32kHz. A detailed construction of the circuit amplifier, its frequency response, and detailed noise characterization is included.

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