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**Atomic Gradiometers for Fetal Magnetocardiography** IBRAHIM SULAI, ZACK DELAND, COLIN WAHL, MICHAEL BULATOWICZ, RON WAKAI, THAD WALKER, University of Wisconsin Madison — We present results on development of  $^{87}\text{Rb}$  atomic magnetometers configured as magnetic field gradiometers for fetal Magnetocardiography (fMCG). Operating in the Spin Exchange Relaxation Free (SERF) regime, the magnetometers have a sensitivity  $\sim 1 \text{ fT}/\sqrt{\text{Hz}}$ . Magnetic field gradient measurements significantly reduce the interference of uniform background fields. In fMCG applications, the field from the mother's heart is one such background and cannot be passively shielded. We report schemes for implementing such gradiometers along with recent fMCG measurements. This work is supported by the National Institutes of Health.

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