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Sensitive magnetometer based on sub-coherence-lifetime limited resonance JIAN SUN, WEIZHI QU, PENGXIONG LI, Fudan University, JIANMING WEN, LIANG JIANG, Yale University, YANHONG XIAO, Fudan University — Previously, we have developed a subtransittime limited resonance technique [PRL 109, 233006(2012)], where a resonance linewidth 2.4 kHz was reported in a vacuum vapor cell with transittime limited width of 75 kHz. Here, we demonstrate subcoherence lifetime limited resonance linewidth of 0.13 Hz by using an alkene coated vapor cell. Furthermore, we apply this technique to DC magnetometry and achieve sensitivity of 11.5 fT per root Hz, even in a vapor cell at room temperature. Also, we will show theoretically how this resonance scheme is essentially a new type of weak measurement.

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