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Modification of dispersion and pulling sensitivity via four wave mixing in a ring cavity[1] EUGENIY E. MIKHAILOV, IRINA NOVIKOVA, The College of William & Mary, SIMON ROCHESTER, Rochester Scientific, LLC, DMITRI BUDKER, Univ. of California, Berkeley — We present our work towards realization of the fast-light gyroscope prototype. Such gyroscopes should have enhanced sensitivity, when compared to a regular laser gyroscopes, provided by the negative dispersion index of refraction. Here, we will discuss schematics and underlying nonlinear effects leading to negative dispersion: level structure, optically addressed transitions, and configuration of the resonant cavity. The important parameter related to the sensitivity of the gyroscope is the pulling factor (how much the lasing frequency shift with the change of the cavity length vs the equivalent resonance frequency shift in the empty cavity). If it is larger than 1, the gyroscope is more sensitive than its canonical laser gyroscope equivalent. Our preliminary data shows that the pulling factor approaches one and even seems to exceed it. Our work is important for application in geophysics, inertial navigation, and geophysics, where one needs to measure minute rotation rates.

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