

Abstract Submitted
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780nm Rubidium Faraday Anomalous Dispersion Optical Filter with Buffer Gas Xe¹ JUNYU XIONG, LONGFEI YIN, Peking University, BIN LUO, Beijing University of Posts and Telecommunications, HONG GUO, Peking University, CREAM TEAM — Faraday anomalous dispersion optical filter (FADOF) is the most commonly used atomic filter, which is usually realized using alkali metal vapor cells. The filter has wide applications fields such as free-space optical communication, lidar and ghost imaging due to its high transmittance and ultra-narrow bandwidth. However, because FADOF is based on the resonant transitions of atoms, and due to the hyperfine structure of alkali elements, the transmittance spectrum of FADOF usually exhibit multi-peak form, which is not appropriate for applications requiring for single peak and will also reduce the signal to noise ratio(SNR). In this work, a 4cm long rubidium cell filled with 1torr Xenon as buffer gas has been used to realize a 780nm FADOF. Under the influence of the buffer gas Xenon, the sidebands of the transmittance spectrum has been removed, and a 780nm FADOF with single peak transmittance spectrum is achieved, which still keeps the high transmittance and ultra-narrow bandwidth. The peak transmittance of the filter is 82.7% if the power loss caused by the optical instruments (38%) is not included, and the bandwidth equals 1.2GHz.

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