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【466】 Towards the next generation of spatial mode interference laser locking

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Traditional laser locking methods rely on reference sideband generation from the main carrier. A modulation-free alternative is the use of spatial modes in an optical cavity. In this poster, we present an all-passive modulation-free method of locking a laser to an optical resonator. We engineer the input beam to contain 2nd order spatial modes of a non-confocal 3-mirror cavity. This method is immune to alignment drifts compared to earlier schemes relying on small beam tilts to induce 1st order modes. We obtain an unprecedented and highly-competitive locking stability of 5×10^{-7} fraction of the linewidth of the cavity at 10 s averaging time.

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