

## Observing mode propagation inside a laser cavity

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### Abstract

The mode inside a laser cavity may be understood as the interference of two counter-propagating waves, referred to as the forward and backward waves, respectively. We outline a simple experimental procedure, which does not require any additional components, to study the forward and backward propagating waves everywhere inside a laser cavity. We verify the previous theoretical-only prediction that the two fields may differ substantially in their amplitude profile, even for stable resonator systems, a result that has implications for how laser resonators are conceptualized and how the disparate traveling waves interact with nonlinear intra-cavity elements, for example, passive  $Q$ -switches and gain media.