

A novel approach to $\tau \rightarrow \ell + \text{invisible}$

New particles ϕ in the MeV-GeV range produced at colliders and escaping detection can be searched for at operating b- and τ -factories such as Belle II. A typical search topology involves pair-produced τ s (or mesons), one of which decaying to visibles plus the ϕ , and the other providing a tag. One crucial impediment of these searches is the limited ability to reconstruct the parents' separate boosts. We construct a novel strategy for such searches. We find an improvement by a factor close to 3 in the branching-ratio upper limit for $\tau \rightarrow e\phi$, with respect to the currently expected limit, assuming $m_\phi \leq 1$ MeV.

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