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Tau-philic light new physics at Belle-II

New physics scenarios addressing the flavor puzzle generally predict dominant interactions with fermions of the third generation. In this talk, I will discuss the prospects for probing light particles beyond the standard model —such as light vectors, scalars and axion-like particles —which possess dominant couplings to the tau lepton. In particular, I will focus on the possibility to investigate these scenarios at Belle-II. I will highlight the complementarity in direct searches, such as the $e^+e^- \rightarrow \tau^+\tau^-\gamma\gamma, \tau^+\tau^-\gamma, 3\gamma$, mono- γ processes, and indirect probes, such as the impact of these new physics candidates on the τ anomalous magnetic and electric dipole moments. The correlated effects in these searches can offer unique hints at the underlying new physics dynamics and point at viable strategies that can be adopted to discriminate between different scenarios.

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