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Heavy Sterile Neutrinos from B decays and new QCD Corrections to their Semi-Hadronic Decay Rates (17'+3')

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In modern experiments on flavour physics it is possible to search for the decays of B 's, D 's, or τ 's into final states with heavy neutrinos N (a.k.a. heavy neutral leptons). I present a common study of theorists and experimentalists from Belle II on constraints on $B^- \rightarrow D^* \ell N$. Next I discuss the status of the theory predictions of the various N decay rates. In scenarios in which N interacts with SM particles only through sterile-active neutrino mixing, the dependence of the lifetime on the relevant mixing angles is important to determine whether N decays in the detector or outside. To calculate the inclusive decay rate into semi-hadronic final states reliably one needs to include radiative QCD corrections. I present analytic results for the QCD-corrected decay rates and discuss their phenomenological impact.

Authors: Mr KRETZ, Tim (Karlsruher Institut für Technologie (KIT - TTP)); NIERSTE, Ulrich (Institut fuer Theoretische Teilchenphysik, KIT CS); FEDELE, Marco (Valencia University IFIC); BERNLOCHNER, Florian (University Bonn); PRIM, Markus (University Bonn)

Presenter: Mr KRETZ, Tim (Karlsruher Institut für Technologie (KIT - TTP))

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