

## **Bottomonium properties at high temperatures from lattice NRQCD**

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I will discuss the properties of  $\Upsilon(nS)$  bottomonium states as well as the properties of  $\chi_b(nS)$  bottomonium states at non-zero temperature using lattice NRQCD. In this study  $48^3 \times 12$  lattices are used with highly improved staggered quark (HISQ) action with physical strange quark and light quark masses corresponding to the pion mass of 160 MeV in the continuum limit. Furthermore, extended quarkonium operators have been used in the analysis ensuring a relatively simple form of the resulting spectral function. We find that bottomonium states have a large thermal width at high temperatures, which is proportional to the temperature. We also observe a sequential pattern of the thermal width, i.e. higher excited states, which are larger in size, have a larger thermal width. We do not see indications for a significant thermal mass shift of bottomonium states. In addition we study the Bethe-Salpeter amplitudes of S-wave bottomonia at zero and finite temperature on the lattice within NRQCD. The above results are based on the following papers:

- [1] R. Larsen, S. Meinel, S. Mukherjee, P. Petreczky, Phys. Rev. D 100 (2019) 074506
- [2] R. Larsen, S. Meinel, S. Mukherjee, P. Petreczky, Phys. Lett. B 800 (2020) 135119
- [3] R. Larsen, S. Meinel, S. Mukherjee, P. Petreczky, e-Print:2008.00100 [hep-lat]

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