

Prospects for searches for a stable double strange hexaquark at Belle II

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QCD-motivated models for hadrons predict a wide variety of multi-quark states beyond ordinary mesons and baryons, known as exotic states.

The first observation of a heavy exotic state by Belle in 2003 has triggered a huge experimental effort, and the last 20 years have marked a turning point in the field.

To date, states composed of four and five valence quark have been observed and their existence confirmed. The possible observation of six-quark states would give us further insight into understanding and describing the strong interaction.

In particular, the search for a stable double strange hexaquark, which was put forward also as a dark matter candidate, is part of the Belle II physics program, and a fraction of the experiment data taking period is plan to be dedicated to run at the energy of the $\Upsilon(3S)$ resonance, particularly well suited for searches for multiquark states with non-zero strangeness.

This talk presents a feasibility study for the search for a stable double strange six-quark state S produced in $\Upsilon(3S)$ decays, with a focus on the obtained predictions for both existing and novel measurements.

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