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## Strange resonances shine in NA61/SHINE

NA61/SHINE is a multi-purpose, fixed-target hadron spectrometer at the CERN SPS. Its research program includes studies of strong interactions as well as reference measurements for neutrino and cosmic-ray physics. A significant advantage of NA61/SHINE over collider experiments is its extended coverage of phase space available for particle production. This includes the entire projectile hemisphere of the collision, with no low- $p_T$  cut-off.

The energy and system-size dependence of strangeness production plays an essential role in studies of the transition from confined to deconfined matter. At the same time, resonance production is a key observable to study the dynamics of colliding systems at high density. With its zero net strangeness and its valence structure composed predominantly of  $s$  and  $\bar{s}$  valence quarks, the  $\phi(1020)$  meson will not be sensitive to strangeness-related effects in a purely hadronic scenario, but will behave like a doubly-strange particle in a partonic system. On the other hand, the  $K^*(892)^0$  meson brings information on the time evolution of the hadronic phase, with the  $K^*(892)^0$  to charged kaon production ratio allowing to estimate the time between chemical and kinetic freeze-outs.

This talk presents the first-ever results on  $\phi(1020)$  and  $K^*(892)^0$  meson production in *intermediate-size* systems at the CERN SPS, that is, central Ar+Sc collisions at beam momenta of  $40A$ ,  $75A$ , and  $150A$  GeV/ $c$  ( $\sqrt{s_{NN}} = 8.8$ ,  $11.9$ , and  $16.8$  GeV, respectively). The presented results include transverse momentum and transverse mass spectra, double-differential rapidity- $p_T$  distributions,  $p_T$ -integrated rapidity spectra, mean multiplicities, and particle ratios. These are compared to data on Pb+Pb and  $p+p$  collisions. The discussion of open and hidden strangeness production enhancement, as well as the time between freeze-outs and rescattering is included in the talk. We also show the comparison with several microscopic models, demonstrating their overall failure in describing these new measurements.

### Category

Experiment

### Collaboration (if applicable)

NA61/SHINE

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