

# $\phi$ production in In-In collisions and the $\phi$ puzzle

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The NA60 experiment measured dimuon production in In-In collisions at 158 AGeV. This talk presents a high statistics measurement of  $\phi \rightarrow \mu\mu$  with the specific objective to provide insight into the  $\phi$  puzzle, i.e. the difference in the inverse  $T$  slopes and absolute yields measured by NA49 [1] and NA50 [2] in the kaon and lepton channel, respectively.

The  $T$  slope parameter, extracted from exponential fits to the transverse momentum spectra in the full range 0 – 3 GeV, shows a strong increase with centrality. Partial fit ranges, matched to the lower- $p_T$  coverage of NA49 and the high- $p_T$  coverage of NA50, show for the latter a flatter centrality dependence and smaller average values of  $T$  than for the former. However, the differences are at most 15 MeV, presumably due to radial flow. This suggests that the difference between the  $T$  slopes measured by NA49 and NA50 in Pb-Pb, which reaches  $\sim 70$  MeV in the most central collisions, is too large to be explained in terms of radial flow alone.

The absolute yield as a function of centrality was also measured. The  $\phi$  enhancement in In-In reaches a factor of about 4 in the most central collisions with respect to previous proton-proton measurements. The comparison to the NA49  $\phi \rightarrow KK$  results shows that the yield in the lepton channel is larger than in the kaon channel, as previously suggested by the NA50 experiment.

The measurements of the  $T$  slopes and of the yield in In-In may thus reinforce the idea that in-medium kaon absorption and rescattering, tending to deplete the observed  $\phi \rightarrow KK$  in particular at low transverse momentum, is at the basis of the high  $T$  slopes and reduced yield observed in the kaon channel with respect to the lepton channel [3-4].

## References

- [1] S. V. Afanasev et al., *Phys. Lett. B* **491**, (2000), 59
- [2] B. Alessandro et al., *Phys. Lett. B* **555**, (2003), 147
- [3] E. V. Shuryak, *Nucl. Phys. A*, **661**, (1999), 119
- [4] S. Pal et al., *Nucl. Phys. A*, **707**, (2002), 525