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## ATLAS measurements of transverse and longitudinal flow decorrelations in Pb+Pb and Xe+Xe collisions

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ATLAS measurements of flow harmonics ( $v_n$ ) and their fluctuations in Pb+Pb and Xe+Xe collisions covering a wide range of transverse momenta, pseudorapidity and collision centrality are presented. The  $v_n$  are measured up to  $n = 7$  using the two-particle correlations, multi-particle cumulants and scalar product methods. The  $v_n$  for  $n=2-7$  is obtained with various correlation methods, together with a non-flow subtraction technique to improve the understanding of flow in peripheral region. A universal scaling in the  $p_T$  dependence of the  $v_n$  is observed for both systems. For the first time, longitudinal flow decorrelations involving two- and four-particle correlations for  $v_2$  and  $v_3$  are measured in Xe+Xe collisions and compared with results from Pb+Pb collisions. The four-particle decorrelation is found to not factorize as a product of two-particle decorrelations. The ability of such measurements to distinguish between different models of initial geometry and to reduce the uncertainty in determining the effective shear-viscosity to entropy-density ratio of the QGP are demonstrated.

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