**Dr Maxim RAKHUBA – ETH Zürich**

**Tensor numerical methods for multidimensional eigenvalue problems**

Tensor decompositions can be used to considerably reduce both complexity and storage requirements when numerically solving multidimensional problems. In this talk, we consider two scenarios of utilizing tensor decompositions. First, we apply them to solve eigenvalue problems with eigenvectors exhibiting point singularities, which is motivated by Schrödinger-type equations in three dimensions. For these problems, we obtain tensor rank bounds and develop a robust and efficient numerical solver. We also consider general-purpose tensor eigensolvers for computing a large number of eigenvalues. In this case, special care is taken to create an easy-to-use, generic way of efficiently implementing gradients using automatic differentiation.