



**Workshop EPFL-Inria**  
**November 23 and 24, 2023, Lyon**

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**Title:** « The random quantum satisfiability problem »

**Abstract:**

The random quantum satisfiability problem (k-QSAT) was introduced by Bravyi as a quantum analog of classical random constraint satisfaction k-SAT. In the quantum setting the problem consists in finding the zero-energy state of a hamiltonian given by a sum of rank-one random projectors each on a set of k qubits. As the ratio of number of qubits-to-projectors, and depending on k, the ground states and their algorithmic complexities exhibit transitions in their nature. I will introduce the problem for a general audience, review basic known facts, and present a new rigorous analysis of the so-called PRODSAT phase when the ground states are of product form. I will also briefly discuss numerical experiments investigating to what extent entanglement is already present in this phase.