Josephson junction array protected from local noises. SERGEY GLADCHENKO, DAVID OLAYA, EVA DUPONT-FERRIER, Rutgers University, BENOIT DOUCOT, Universités Paris 6 et 7, Paris, France, LEV IOFFE, MICHAEL GERSHENSON, Rutgers University — We have developed small arrays of Josephson junctions (JJs) that can be viewed as prototypes of superconducting qubits protected from local noises [1]. The array consists of twelve superconducting loops interrupted by four sub-micron JJs. The protected state is realized when each loop is threaded by half of the magnetic flux quantum. It has been observed that the array with the optimized amplitude of quantum fluctuations is protected against magnetic flux variations well beyond linear order, in agreement with theoretical predictions [2].