Chirality is a ubiquitous concept in modern science, from particle physics to biology. In quantum physics, chirality of fermions is linked to the topology of gauge fields due to the quantum chiral anomaly. While the chiral anomaly is usually associated with the short-distance behavior, recently it has been realized that it also affects the macroscopic behavior of systems with chiral fermions. In particular, the local imbalance between left- and right-handed fermions in the presence of a magnetic field induces non-dissipative transport of electric charge ("the Chiral Magnetic Effect"). In heavy ion collisions, there is an ongoing search for this effect at Relativistic Heavy Ion Collider, with results from a dedicated isobar run expected before the end of 2021. An observation of CME in heavy ion collisions could shed light on the mechanism of baryon asymmetry generation in the Early Universe. Recently, the Chiral Magnetic Effect has been discovered in ZrTe5 and other materials possessing chiral quasi-particles. This observation opens a path towards a new kind of quantum computers and quantum sensors.