Quantum field theories in physics (especially string theories, but there are other cases as well) are often related by what physicists call T-dualities. (The “T” stands for “target space.”) These relate a theory on one spacetime $X$ to a theory on another spacetime $X'$, often with a change of certain auxiliary fields. Such a duality is accompanied by a matching of charges of “D-branes” in one theory to those in the other. Mathematically, this is represented by an isomorphism of $K$-theories (possibly with twisting) on $X$ and $X'$, usually with a degree shift. In many cases, this $K$-theory isomorphism arises from a special case of the Baum-Connes Conjecture. We will discuss this phenomenon, with examples. (Received September 15, 2016)