The strongest interaction between microscopic spins in magnetic materials is the exchange interaction $J_{\text{ex}}$. Therefore, ultrafast control of $J_{\text{ex}}$ keeps the promise to control spins on ultimately fast timescales, potentially by passing fundamental speed limits for the control of magnetism with magnetic fields. In this talk we present our latest result on the manipulation of the exchange interaction by strong electric fields [1]. We demonstrate that time-periodic modulation of the electronic structure by sub-picosecond electric-field pulses can be used to reversibly control $J_{\text{ex}}$ on ultrafast timescales in Mott insulators. In the regime of weak-driving strength the modification of $J_{\text{ex}}$ is proportional to the intensity of the electric field and we find that $J_{\text{ex}}$ can be enhanced and reduced for frequencies below and above gap, respectively. Furthermore, a highly non-trivial effect of periodic driving is found for very strong driving. Here even the sign of the exchange interaction can be reversed and we show that this causes time reversal of the associated quantum spin dynamics. This regime might be accessible in cold atoms systems and opens up possibilities for fundamental studies concerning the reversibility of the quantum many-body dynamics.