Tensor products provide a versatile tool to approximate various quantities encountered in electronic structure calculations like orbitals, reduced density matrices, and two-particle correlation functions. The first part of the talk provides an overview on some recent results concerning the best N-term approximation of these quantities in anisotropic wavelet tensor product bases. Best N-term approximation theory studies the properties of best possible approximations which use at most N basis functions out of a given basis set. The second part of the talk deals with more general types of tensor products which do not rely on fixed multivariate bases anymore. These so called Kronecker tensor products comprise best possible separable approximations for a given rank, where individual univariate components can be efficiently represented in a wavelet basis. In combination with stable quadrature schemes for the Coulomb interaction, these tensor products enable an efficient evaluation of two-electron integrals. We present an alternative approach to density fitting schemes based on Gaussian-type basis functions. It will be shown that substantial further compressions with respect to the tensor product rank can be achieved compared to traditional Gaussian-type basis sets. Finally we discuss possible applications of these concepts for tensor product approximation within a recently developed Jastrow perturbation theory.