The interaction of intense bicircular laser fields with atoms has recently received a lot of attention. A bicircular field is the superposition of two circularly polarized fields that rotate in the same plane, usually in opposite directions (counterrotating), with different frequencies. The case of a frequency ratio of 2:1 is the standard situation, but other frequency ratios and incommensurate frequencies are also considered. Counterrotating bicircular fields are known to generate very intense circularly polarized high-order harmonics that obey certain selection rules [1,2]. This can be understood in detail in the framework of quantum-orbit theory [3–7]. Recently, much interest has focused on atomic processes induced by bicircular fields [8–11].

In the present contribution we will consider direct above-threshold ionization (ATI) [12,13] and high-order ATI and high-order harmonic generation (HHG). We use the strong-field approximation and especially discuss the quantum-orbit description of these processes, which provides an appealing intuitive picture and readily explains the high efficiency of HHG. We will also present results for angle-resolved HATI spectra obtained using the improved strong-field approximation and show that they agree with the recent experiment [14].

References