

<<韧致辐射基本过程>>

图书基本信息

书名：<<韧致辐射基本过程>>

13位ISBN编号：9787301219379

10位ISBN编号：7301219377

出版时间：2012-12

出版时间：北京大学出版社

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内容概要

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章节摘录

版权页：插图：4.3.3 Further polarization correlations Apart from the correlations considered above where in each case only one polarization variable is involved, there are also correlations between the polarizations of the collision partners. We mention some examples, although for none of them the elementary process was measured so far. A correlation that is well known is the production of circularly polarized bremsstrahlung by longitudinally polarized electrons (see Sec.3.7.3). The process has been frequently used in parity non-conservation experiments for measuring the polarization of β particles [79]. A circular bremsstrahlung component, though with lower degree of polarization, is also produced by transversely polarized electrons (see Sec.3.7.3). Following Olsen [65], it is interesting to note that the time reversal argument shows that to the lowest order in the interaction for any process only correlations between an even number of polarizations are present. So in lowest order approximation unpolarized electrons do not produce circularly polarized bremsstrahlung unless the polarization of the final state electron is recorded in coincidence. For a complete scattering experiment (cf. Sec.4.3) the emitted photons are expected to be completely elliptically polarized.

4.4 Tagged photons : The application of the coincidence technique in producing quasi-monochromatic photon beams In several fields of physics, such as atomic or nuclear physics, quasi-monochromatic photon beams are required. In the tagged photon method, the outgoing electron from the bremsstrahlung process is detected in coincidence with a particle produced by the photon-induced process to be studied, e.g., a nuclear-decay product following a photon-induced reaction. Figure 4.19 shows a schematic diagram of the tagged photon method. An electron beam of known energy E_0 strikes a radiator (thin metallic target or a monocrystal) generating a stream of bremsstrahlung photons. The outgoing electrons are momentum analyzed in the field of a magnetic spectrometer and correlated in time with some subsequent reaction product of the bremsstrahlung photons.

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