

Humblet's decomposition of radiated electromagnetic angular momentum: historical review of applications to scattering

P. L. Marston

Washington State University, Physics & Astronomy, Pullman, United States (marston@wsu.edu)

Ongoing interest in the evaluation of electromagnetically radiated angular momentum makes it appropriate to review applications to light scattering of Humblet's decomposition of radiated angular momentum [1]. For example, when circularly polarized light is scattered by an isotropic sphere, Humblet's decomposition was helpful for understanding why the axial projection of the scattered angular momentum associated with spin gives incomplete information concerning the axial projection of the total radiated angular momentum [2]. The application to Mie scattering was carried out to give deeper insight into why the electromagnetic radiation torque is simply proportional to the power absorption in the case of an isotropic sphere [2-4]. This approach also provides insight into the measurability (from Stokes parameters) and gauge-invariance of the spin transport [4]. For examples of applications in light scattering and optical torques, see [5,6]. As a comparison, the partially analogous situation of acoustic radiation torques on axisymmetric objects in acoustic vortex beams is noteworthy [7,8].

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