

Abstract Submitted  
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**Brownian motion of a particle with arbitrary shape**<sup>1</sup> ELIGIUSZ WAJNRYB, Institute of Fundamental Technological Research, Polish Academy of Sciences, BOGDAN CICHOCKI, Faculty of Physics, University of Warsaw, MARIA L. EKIEL-JEZEWSKA, Institute of Fundamental Technological Research, Polish Academy of Sciences — We consider a single Brownian particle of an arbitrary shape, in general non-axisymmetric. Starting from the Smoluchowski equation we develop a new formalism, which allows to determine the particle rotational and translational motion in a much simpler way as this which is based on the Euler angles and Wigner functions. Our approach makes use of the rotational matrix and irreducible tensors. The essential result of our presentation is that using our new formalism, we derive simple explicit analytical expressions for the cross-correlations of the Brownian translational and rotational displacements. The role of the particle mobility center is determined and discussed. No such formulas have been known yet - instead, numerical Brownian simulations have been extensively used. We compare our analytical results with low Reynolds number experiment and numerical simulations performed at the time scales comparable with the characteristic time of the rotational Brownian diffusion.

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Eligiusz Wajnryb  
Institute of Fundamental Technological Research, Polish Academy of Sciences

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