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Marian von Smoluchowsi's Oeuvre on Diffusion and its Impact from Natural Sciences to Social Sciences

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In this lecture I like to highlight the salient scientific achievement by Marian von Smoluchowski during his life which ended far too early with his sudden death on September 05, 1917, at his young age of only 45. He has been the trailblazer for what nowadays is known as the theme for "**Stochastic Physics**".

He provided us with several ground-breaking contributions to (1) the theory of Brownian motion, (2) the theory of sedimentation, the statistical nature of the Second Law, (4) experiments and theory of density fluctuations (critical opalescence) and last but not least, during his final years for (5) his pioneering theory of coagulation and diffusion-limited reaction rate theory.

His outstanding achievements present true gems which impact and inspire theory and experiment for soft matter physics, chemical physics, economic sciences, and social sciences up to present days. After bringing back to our minds his remarkable scientific path I also illustrate his cutting-edge thinking for timely present-day activities and future, still open challenges.