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The Unreasonable Effectiveness of Analogy in the Natural Sciences and Their Public Dissemination: The Case of Gravitational Waves

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The title of this paper, a clear paraphrase of Eugene Wigner’s renowned essay on the role of mathematics in the natural sciences, is intended to highlight the epistemological significance of analogical reasoning—a process that the history of science has shown to be pivotal across numerous domains and in a wide range of discoveries. The resemblance between concepts, the referencing and evocation of pre-existing ideas through aesthetically resonant metaphors, allows these ideas to be set in motion, to move beyond axioms and empirical evidence, and to venture—boldly—into directions that would otherwise remain inaccessible. The use of analogy is often explicitly acknowledged in the works of great scientists; a notable example is Albert Einstein, who makes deliberate use of it—for instance, when introducing his concept of gravitational waves by stating that the relevant calculation is carried out “in a manner analogous to that of retarded potentials in electrodynamics.” The aim of this contribution is therefore to initiate an analysis of the role of analogical reasoning in the particularly evocative case of the term “wave”, and to illustrate how I employ this strategy within Chirp!, a page which I intend to develop as a platform for the public dissemination of the GraWita project and with a specific focus on the forthcoming research to be conducted using the Einstein Telescope.

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