

Physics, Mathematics, and the Real World



Physics is a fundamentally human activity. It is a collective expression of the sense of wonder we feel before the rich diversity of the natural universe.

“The most beautiful experience we can have is the mysterious. It is the fundamental emotion that stands at the cradle of true art and true science.”

—ALBERT EINSTEIN

Your gut-level “Oh, wow!” response when you witness a spectacular sunset is an expression of wonder. But wonder isn’t *just* “Oh, wow!” and certainly not “Oh, wow! Now let’s go to dinner.” Wonder couples the “Oh, wow!” response with curiosity, with the urge to explore what you’re seeing. In this sense, science and the arts are somewhat alike.

“There is no science without fancy, no art without facts.”

—VLADIMIR NABOKOV

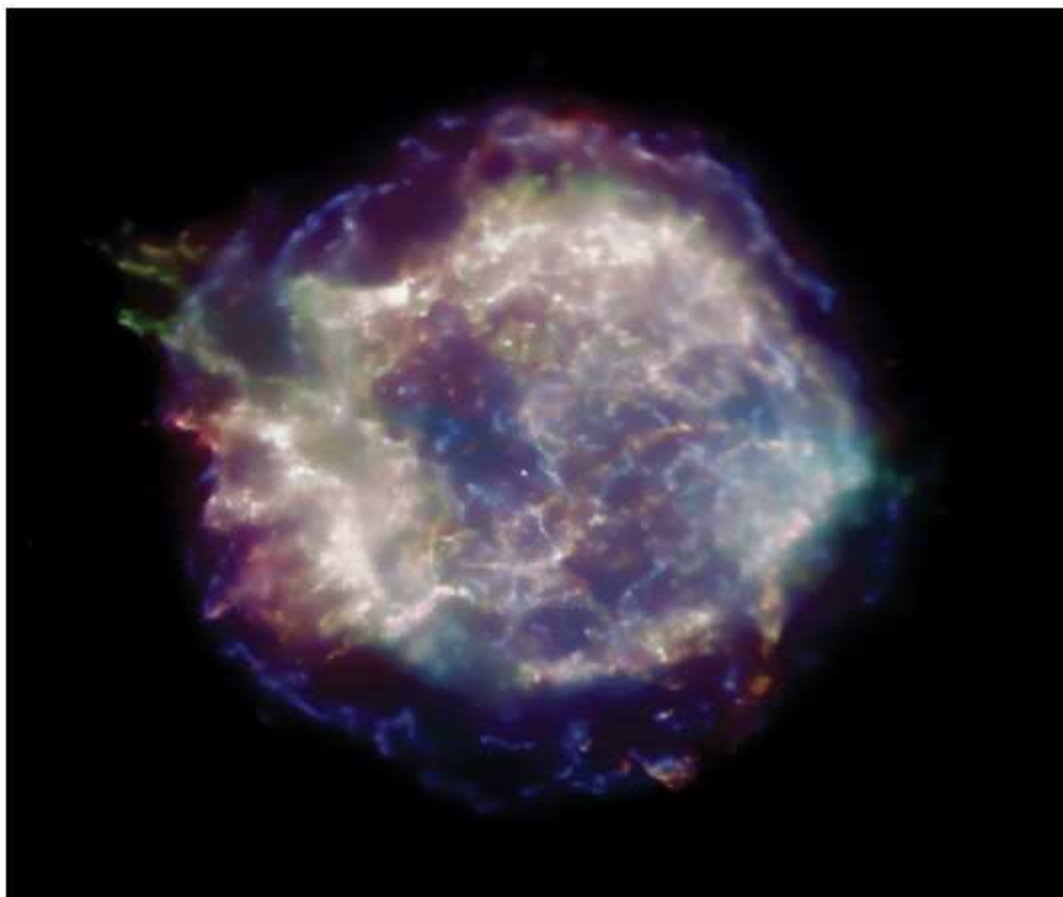
But physics, like all true science, goes an important step further by aspiring to *collective* understanding—not just how *I* understand something but reaching agreement on how *we* understand it.

“Art is I. Science is we.”

—CLAUDE BERNARD, *nineteenth-century physiologist*

Reaching agreement is not merely a matter of majority rule. Physicists must exchange ideas and verify one another’s observations and reasoning, testing whether behavior implied by the reasoning is borne out by further observations. Thus, they carry on the very human activity of consensus building in careful and refined ways. Physics is a

consensual body of knowledge to which many individuals have contributed. Humans are social animals, and physics is very fundamentally the activity of a social species.



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