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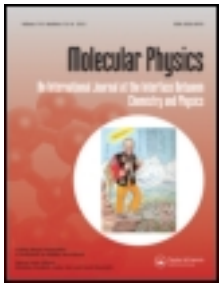

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On the Radial Dependence of the Herschbach Effect

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INVITED ARTICLE

On the Radial Dependence of the Herschbach Effect

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We present the first results of a study of the radial dependence of the Herschbach effect. The effect displays distinctive short-range behaviour, evidently due to a contact interaction, and also reveals mid- and long-range behaviours. Cosmological implications of the long-range Herschbach effect are explored.

Although the Herschbach effect – an elevation of spirit, usually accompanied by a sharpening of vision – has been long recognized, not until the present work has there been a systematic investigation of its spatial dependence. This Note reports the initial results of a study of this elusive but significant phenomenon.

At short distance, < 3.5 m, which we refer to as the *anecdotal range,* the effect is propagated by narratives of personal experience ranging from leporidae raising and star gazing in California to lightning watching in Japan and arbor dodging in Massachusetts. Instructive and sometimes humorous incidents from the life of Benjamin Franklin appear from time to time. These are but a few of the extensive collection of anecdotes in the database of *Project Dudley*. This dataset has been classified according to subject, location, date, etc. Appropriate ethnographic data has been attached to each entry and the collection has been cross-correlated for statistical independence. The result reported here must be regarded as tentative while the collection undergoes final fact-checked following the *Manual of Best Practice* by the American Society of Anecdotal Skeptics (ASAS).

To quantify the strength of a Herschbach anecdote, we define the total impact T which is the product of the impact-factor (I) and the number of auditors (N). I is determined by observing the brain activity of a representative sample of test subjects while the anecdote is narrated by a professional storyteller or a stand-up comedian. The brain activity is monitored by electroencephalography (EEG) and data from dormant auditors is deleted. The auditors are drawn from a representative sample of the Friends of Dudley Herschbach (FDH).

First results suggest that the value of T for verbally transmitted anecdotes falls off with distance from the speaker so abruptly that the detailed behaviour is unimportant. Consequently, the total impact $T = IN$ can be well described by taking $N = n\ \mathrm{A}_{\mathrm{eff},}$ where n is the number of auditors per unit area at the event, and $\mathrm{A}_{\mathrm{eff}}$ is an effective area. The radius of $\mathrm{A}_{\mathrm{eff}}$ is generally the lesser of eyeshot and earshot. This behaviour is reminiscent of the Fermi contact interaction between an atomic nucleus and a valence electron and so we refer to the phenomenon as the *Herschbach anecdotal contact interaction* (HACI*)*.

The mid range Herschbach effect displays a fundamentally pedagogical nature. A somewhat disquieting aspect of this study is the failure to identify the precise dimensions of the mid-range and these remain a matter of some debate. For instance, although freshman seminars are pedagogical, they nevertheless display hallmarks of the contact interaction. At the other radial extreme, there is compelling evidence that Herschbach's pedagogical power extends beyond the walls of academe to science festivals, scientific conferences, public lectures, essays, radio interviews and YouTube presentations. The proliferation of such loci suggests that mid range actually penetrates into the far field. Nevertheless, the principal arena for the mid range Herschbachian interaction extends from front row to the back row of a freshman lecture hall.

The reaction to the mid-range Herschbach differs significantly from the normal response of a freshman class to a heroic lecturer. The distinction appears to arise from the reciprocal nature of the pedagogy which encourages the class to display a back reaction. Consequently, not only is the class not discouraged

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from grilling the lecturer, it is actually encouraged to engage in mind-expanding pursuits such as writing poems and delving into history, pursuits normally discouraged, if not actually prohibited, in a science class. Most importantly, student–teacher bonding is strengthened by the free exchange of sacred knowledge such as that a scientist can be 99% wrong and nevertheless be famous, that nature speaks in many tongues, all of which are alien, and that in geometrical constructions all angles that look equal are equal.

The long range Herschbach effect conveys the beauty, joys and virtues of science to a community that encompasses all of humanity. Such an effect must be recognized as among the great forces of nature. Prominent among its force carriers are parables, aphorisms, metaphors, narratives, biographies and occasional gossip. These carriers propagate in a medium of talks, lectures, interviews, and essays. (In the spirit of full disclosure, which is fundamental to the Herschbach effect, one must also mention that there have been after dinner speeches.)

The far field Herschbach effect has yet to reveal its radial dependence. In particular, there is no evidence that it is affected by gravity and so we have the possibility that the field extends throughout the universe. When one considers the energy, enthusiasm and brilliant insights of the Herschbach effect, one cannot avoid the possibility that the Herschbach field may hold the answer to one of the great problems of physical science – the origin of dark energy. Further study is required.

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(*Note added in proof*) The author is grateful to an anonymous colleague for pointing out that Dudley Herschbach is 14 billion years too young to be the source of dark energy.

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