# Reply to "Comment on 'Intermittency exponent of the turbulent energy cascade' "

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In reply to Castaing's comment on Cleve *et al.* [Phys. Rev. E **69**, 066316 (2004)], we note that the discrepancy that exists between the air data and jet data in helium occurs at *high* Reynolds numbers. The helium data at high Reynolds numbers do not adequately resolve the small scales and so the dissipation statistics deduced from them should be used with caution.

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The accompanying comment [1] on [2] makes the case that the use of Taylor's hypothesis biases the intermittency exponent $\mu$ at low Reynolds numbers, and hence calls into question the Reynolds number dependence found in [2]. In several Ph.D. theses written under this author's supervision [3–5], as well as elsewhere (e.g., [6]), the issue of Taylor's hypothesis has been explored in various ways. No one knows how that hypothesis distorts the results exactly, and we do not necessarily disagree that $\mu$ may indeed be constant if one were able to dispense with the hypothesis and get accurate spatial data directly. Neither [2] nor [1] has accomplished this feat, so that the statement of [1] is merely academic for now. We are in the process of addressing this issue using direct numerical simulations.

The main point of [2] concerning [7] was quite different. It was that the discrepancy between the air data and the helium data occurs at *high* Reynolds numbers, where there are some resolution issues with the helium data. In [2], we were circumspect in pointing out this possibility, and, in fact, had some discussions with one of the authors of [7]. We admire the helium jet as a significant advance in generating high Reynolds number flows, but, that admiration notwithstanding, regret to have to point out that the velocity data at high Reynolds numbers suffer from poor resolution.

The evidence for this statement is ample. It is clear already in the bottom panel of Fig. 1 of [2], which shows a spectral density of the helium data lent to us generously by one of the authors of [7]. It is evident in Fig. 6a of [8]. It is also evident in the comparisons of the normalized spectra in Fig. 4 of [9]. Thus, it is prudent to take the dissipation statistics obtained from those measurements, whatever massaging of data one may subsequently perform, with some caution.

Indeed, there is growing realization [10] that even air data may not have resolved small scales adequately at high Reynolds numbers—though the problem is far less severe there. In [11,12], efforts are being made to examine the severity of this issue.

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