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Effect of scalar-field initial conditions on the internal intermittency of turbulent passive scalars[1] JASON LEPORE, LAURENT MYDLARSKI, McGill University — Lepore and Mydlarski[2] recently measured the inertial-convective-range structure function scaling exponents of a turbulent passive scalar field (ξ_n) in hydrodynamically identical flows for which the passive scalar field was injected using two different techniques. The flow under consideration was the turbulent wake of a circular cylinder and the scalar fields were injected by: (i) heating the cylinder, and (ii) use of a mandoline. Lepore and Mydlarski showed that the higher-order structure function scaling exponents were dependent on the passive scalar field boundary conditions – a result that (i) explained the previously observed variations in ξ_n reported by different research groups (who generated their passive scalar fields using different methods), and (ii) is, ostensibly, in violation of Kolmogorov-Oboukhov-Corrsin theory. The present work further explores the role of the passive scalar field boundary conditions in turbulent mixing by means of additional statistical analyses (conditional expectations, inverse structure functions of passive scalar increments, etc.) in an attempt to elucidate the relationship between the boundary conditions and the internal intermittency of the turbulent passive scalar field.

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[2]Lepore and Mydlarski, 2009, *Phys. Rev. Lett.*, **103**, 034501.

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