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Rotation rate of tracer and long rods in turbulence SHIMA PARSA, GREG VOTH, Wesleyan University — We study the rotational dynamics of single rod-like particles ranging from tracer rods to long rods and quantify the effects of length of rod on its rotation rate in turbulent flow. The orientation and position of rods are measured experimentally using Lagrangian particle tracking with images from multiple cameras in a flow between two oscillating grids. Rods rotate due to the velocity gradient of the flow and also develop alignment with the directions of the velocity gradient tensor as they are carried by the flow. Small tracer rods rotate due to the velocity gradient of the smallest eddies that produce the largest shear rate while longer rods average over length-scales smaller than their size to eddies order of their own length-scales. The rotation rate variance gets smaller as the length of the rod increases.

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