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Reply to Letter to the Editor

Response to the comments regarding the work "On the variation of precessional flow instabilities with operational parameters in stirred vessels"

The work described in Nikiforaki et al. [1] concerns flow phenomena of considerable complexity and the results presented there can provide only a brief insight into the related physics of the flows. The reader should be referred also to some of the other works on instabilities of the flow in stirred vessels, the findings of which should be juxtaposed with those in [1]: those concerned with relatively high Reynolds numbers (*Re*) at constant vessel and impeller diameter [2], as well as with both low and high *Re* and for different impeller diameters [3,4]. Understanding of the macro-instability phenomena is further complicated by their interaction with other flow instabilities evident with impellers at low clearance [5], which are exhibited together with the instabilities addressed in [1] for some operating conditions [6].

There can be no doubt that, as the correspondent correctly observes, the origin of the radial profiles in stirred vessels lies in the impeller discharge flow and the instabilities have been reported to be present over a wide range of *Re*, albeit with different characteristic frequencies [3]. However, a more complete experimental characterisation of the related phenomena can only be achieved with multi-point laser-Doppler anemometry (LDA) or (planar) particle image velocimetry (PIV) measurements and this work is on-going. We have, for example, recent confirmed experimentally with two-point LDA measurements [7] that there is a phase difference of around 160–200° of angle between the precessional motion detected simultaneously at two different locations, one above and one below the impeller in a stirred vessel. At present the precise shape of the axis of precession across the entire vessel is being studied and this work will be reported in the near future. The authors appreciate the interest generated by and exhibited in the work reported in [1] and thank the correspondent for the comments and clarifications.

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