

Quick reply to reviewer comment #2

We appreciate the critical review. We deem it appropriate to provide a swift comment to clarify that there is no inconsistency with the fundamental model setup in the study. We are under the impression that the confusion caused to the reviewer stems from assuming certain approximations of the advective velocity profile in conjunction with the peak advective velocity, resulting in flow rates putatively incompatible with values from Table 1.

The modeling indeed uses the flow rates from Table 1 (20 slpm for MION, 30 slpm total for Eisele), consistent with what is in the literature.

The reviewer seems to use a constant velocity profile (“plug flow”) to derive the high flow rates calculated in the comment (45 slpm for MION, 160 slpm for Eisele) that are indeed not compatible with the literature (too high). Assuming a parabolic velocity profile (a fully developed laminar flow) leads to flow rates that are lower by a factor of 2 (22 slpm for MION, 80 slpm for Eisele). For the MION inlet, this flow rate is compatible with the values shown in Table 1. For the Eisele inlet, this still seems incompatible. Here, it turns out that the velocity profile is neither constant nor parabolic, but rather behaves as depicted in Figure C1 (blue line). The flow velocity has a pronounced peak in the center, the velocity of the sheath flow is modeled to be rather weakly varying. This profile establishes as there is not much time for a fully parabolic flow to develop in the IMR after the core and sheath flow (green lines in Fig. C1) merge. Contributing to this non-parabolic profile is the fact that the velocity profile downstream of the IMR (close to the pinhole plate) is not parabolic, either. This is an interesting observation which is not obvious from the manuscript figures in their current form.

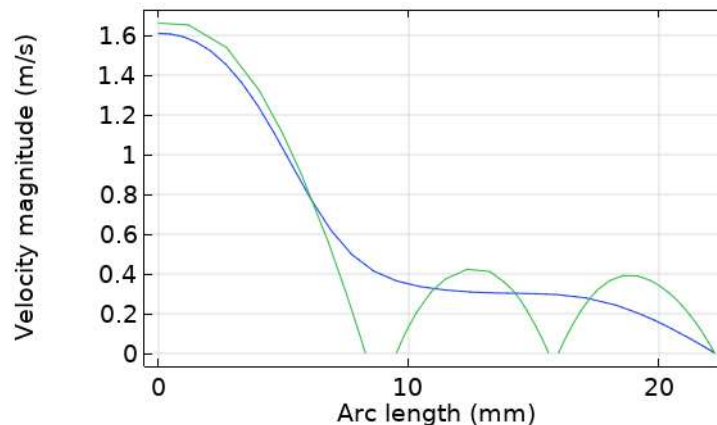


Figure C1: Flow velocity as function of radius (arc length) in the Eisele-type inlet. Profile before merging of sheath and core flow (green) and in center of IMR (blue). While the individual flow profiles are parabolic before merging, a parabolic flow in the IMR does not fully develop.

Effectively, we are confident that there is no fundamental problem with the study and that we will be able to clarify the profile of flows throughout the Eisele and MION inlet in a revised version of the manuscript that avoids confusion or misinterpretation. In due time, we will provide such a revised manuscript that also incorporates modifications motivated from the other reviewer comments.