

Comment 1: In Sect. 3.1: Delete the sentence “Furthermore, IMAQ uses one corner ... pixel center.” You already specify that corners are used two sentences earlier.

Deleted

Comment 2: In Sect. 4: Your changes in L184-202 explaining that PIP image processing is now applied to the raw PIP images PRIOR to applying the shape-fitting algorithms are very useful. You can improve them by making clear that this happens before emulation and fitting. E.g., insert a “prior” or “first” in an appropriate place.

The first sentence now reads:

“For the emulation of both MASC and 2DVD as well as the implementation of the tensor method, the PIP images taken from the AVI files undergo image processing matching that of the PIP (\citeauthor{Newman_et_al2009}, \citeyear{Newman_et_al2009}; L. Bliven, 2022, personal communication) prior to performing any emulation or shape fitting.”

Artificial cap reflections questions:

Circle: The circle generation results in a black and white circle with a fuzzy (greyscale) edge.

Perimeter: Correct, the circle has a value of one and the background has a value of zero

Area: The image process produces an image that is composed of values of either zero (background) or one (circle). I compute area as the number of pixels in the circle (specifically, I take the total of the array).

Pixelizaton: I agree pixilation could theoretically explain the cap (something I was not initially expecting), although I suspect that both the pixilation and the non-sphericity are simultaneously ensuring the presence of the artificial cap.

Comment 3: “In theory, ... algorithm” text:

I went ahead and just deleted the paragraph.

Comment 4:

The sentence was intended to cover both non-sphericity and pixilation. I made this clearer by changing the sentence to refer to the “true particle edge”:

“Small increases in perimeter, such as this, can be introduced by a few very small deviations of the true particle edge from a perfect circle as well as by the inability to perfectly represent a circle using square pixels (i.e., pixelation effects).”

Comment 5:

I went ahead and split the bullet point into two. These bullets now read:

- The PIP shape-fitting algorithms do not perform well due to their reliance on only the area and perimeter of a particle leading to a tendency towards overestimating the long dimension and underestimating the short dimension (section 5.1).
- The aspect ratios of the PIP-fitted shapes are highly sensitive to small deviations from the smooth-edged fitted shape, such as pixelation effects or any underlying non-sphericity of the particles (section 5.1).

I also moved the list of affected variables into the final paragraph of the paper.