

DEM Round Robin
Response to Questions
June 28,2020

• **How will you determine accuracy in both experiments and simulation?**

- There are some standard techniques for assessing error margins on PEPT data. The accuracy of single particle location can be determined by imaging a stationary source within the system of interest, and simply measuring the standard deviation on location, which allows us to quantify the sensitivity of measurement for a specific tracer in a specific system, this being our "raw" PEPT data. The errors on a particular quantity of interest extracted from PEPT data (our "post-processed" PEPT data) - e.g. a velocity vector field or density profile - can be determined either by performing multiple repeat experiments and finding the standard error thereof or, more commonly, performing a single, long experiment and analysing this experiment across a number of distinct windows; under the assumption of ergodicity, this is in fact equivalent to performing multiple repeat experiments. This matter is discussed in detail in a recent review paper by myself and Jonathan (<https://www.annualreviews.org/doi/pdf/10.1146/annurev-chembioeng-011620-120633>).
- The accuracy with which the simulations performed reproduce the true experimental system is determined through comparison with our PEPT data, as well as additional lensforce sensor data. This is described in some detail in slides 10-13 of the attached presentation from last year's AGM

• **What will you do if you have systems not checking all 3 rules?**

- I am assuming that this is referring to the 3 criteria outlined on slide 11 of this year's presentation? (Please correct me if I am wrong!). Thankfully we know already that this is not the case - we have already acquired data from both experimental systems, and thankfully they fulfil the proposed criteria very well.