Characterisation …
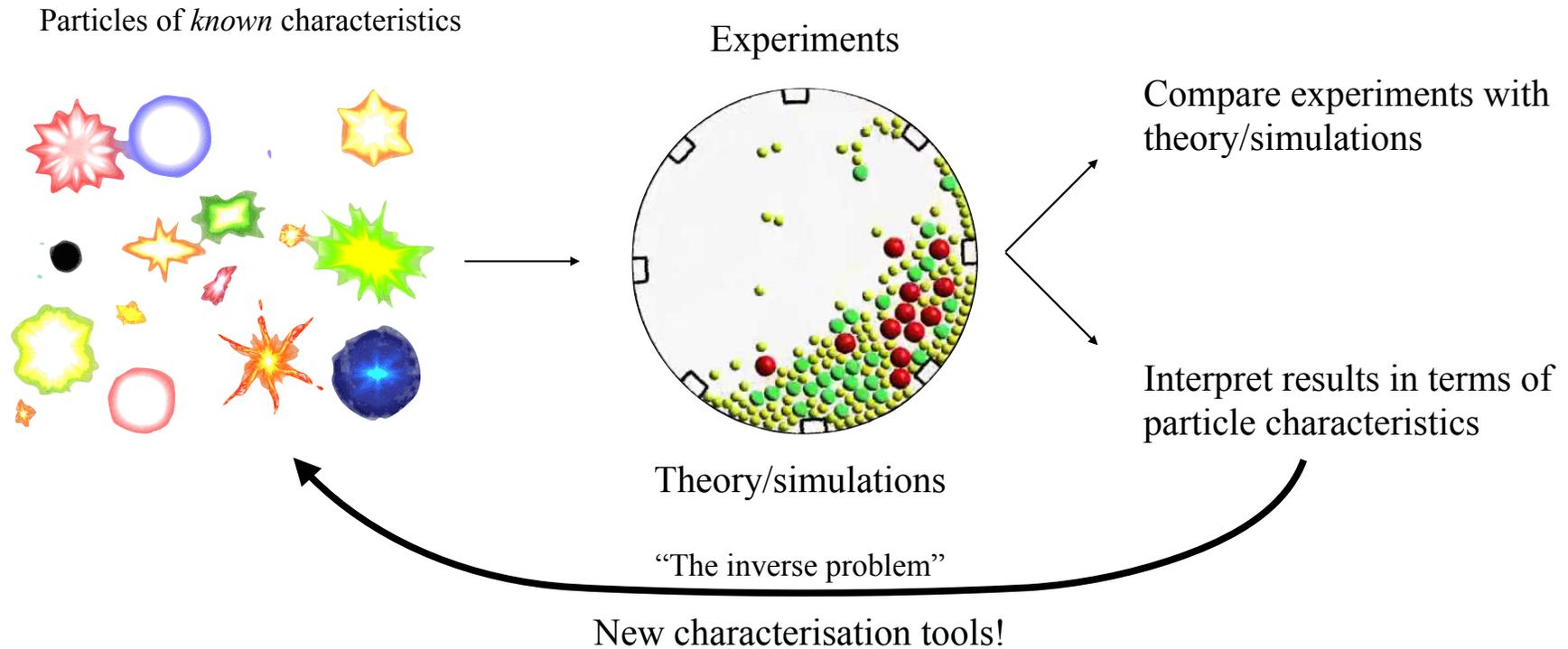
… should not be about looking where we *can*

… but about looking where we *need* to look

… even if that's harder work!

What novel characterisation opportunities emerge from current projects?

A good way to tell us
where we *need* to look!

Typical academic research in particle science & technology

Particles of *known* characteristics

Experiments

Compare experiments with
theory/simulations

Interpret results in terms of
particle characteristics

Theory/simulations

"The inverse problem"

New characterisation tools!

Three examples

Plenary lecture

Surface rheology → Particle properties? … *provided* the complex hydrodynamics can be modelled

Precision Powder Feeding

Agreement between stress/feed rate & DEM → use measurements to back out particle characteristics?

Model-assisted design of granular products

Estimate poorly-known particle parameters as input → robust reverse procedure for characterisation?

- Collaboration proposals to emerge from the work of these academics?
- More possibilities based on other projects?

Two other ideas arising

(1) **Characterising porous particle systems** (arising from Urs Peuker's filter cake project)

Veerle Crude (2014): review from the perspective of the earth sciences

Kevin Kendall (1999): review from the perspective of particle technology

A very recent development (2019): high-intensity lab sources for X ray CT (Zeiss Xradia Versa family) …
… brings possibility of quasi-real time tomography in the lab (rather than synchrotron)

- New review?
- Project to develop particle-technology applications for real-time tomography?

(2) Round table and/or workshop and/or round robin on light scattering

Arising from Bruno Hancock's round table on Methods and Specifications for Particle Properties

Very lively second session on light scattering …

Different instruments/methods give different answers
Effect of sample preparation
How to use imaging data to constrain LS data interpretation
Etc.

Issues *not* discussed in recent (2021) David Scott review on wet characterisation.

Roundtable → Workshop: to explore issues in depth, from basic physics to applications

Review/project/round robin, e.g.

* Comparing measurements across different labs to tease out causes of variability (cf. DEM round robin)
* Using model systems to explore how to develop work- and data-flow protocols,
* Exploring the potential of using machine learning to integrate LS as part of multi-method approach