

For molecular mass measurements with unmatched sensitivity, speed and simplicity of use. Refeyn's second-generation mass photometer, the Two^{MP}, offers wider mass range, and improved resolution and statistics.

ABOUT MASS PHOTOMETRY

Mass photometry (MP) is a novel technology that offers a revolutionary approach to biomolecular analysis. MP analyses biomolecules in solution at the single molecule level, in their native state and without the need for labels. It measures the light scattered by single molecules, and uses this signal to count the molecules and measure their mass (Fig. 1).

MP is used to study molecular interactions, oligomerisation and macromolecular assembly. It also enables straightforward assessment of sample quality and stability, powering rapid process optimisation cycles.

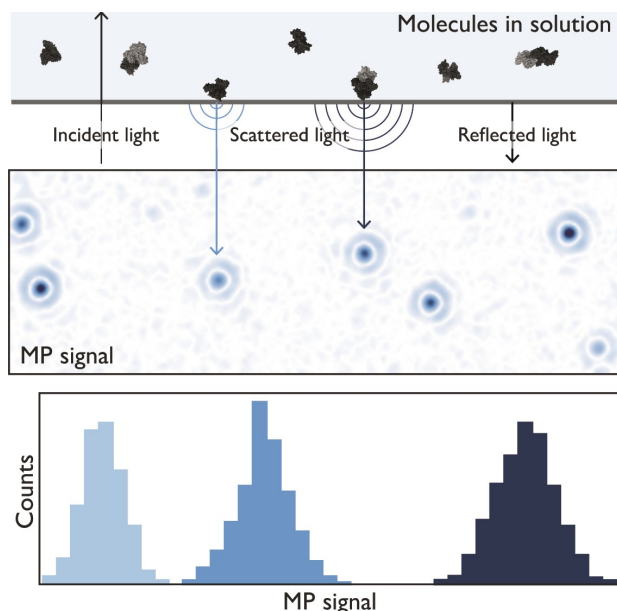


Fig. 1 The principle of mass photometry. The light scattered by a molecule attached to the measurement interface interferes with light reflected at that interface. The signal intensity scales linearly with mass.

KEY ADVANCES OF THE TWO^{MP}

The Two^{MP} is Refeyn's second-generation mass photometer and offers a broader mass range, for detection of molecules between 30 kDa and 5 MDa. The Two^{MP} also features improved resolution, especially at higher masses (Fig. 2).

The new optics design of the Two^{MP} increases the detection area, enabling higher molecule counts in a single experiment – to improve statistics and refine quantifications.

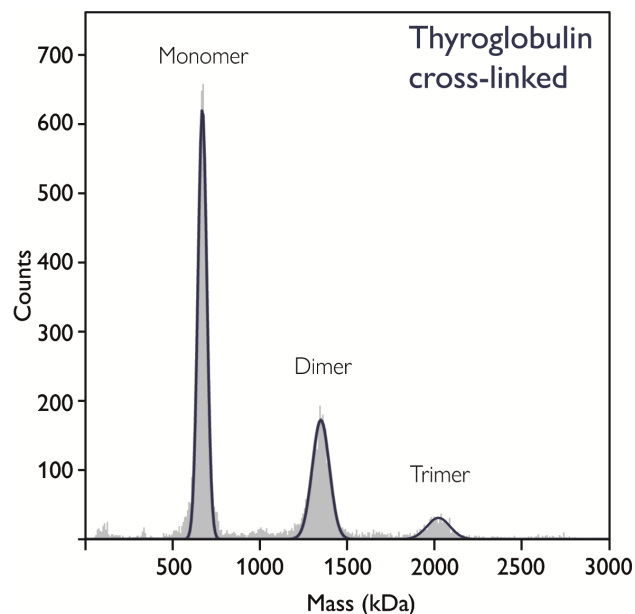


Fig. 2 The Refeyn Two^{MP} features improved resolution and increased count rates. MP measurements made using the Two^{MP} of cross-linked thyroglobulin exemplify the instrument's improved resolution at 660 kDa, 1.3 MDa and 2 MDa, as well as its excellent dynamic range. The Two^{MP} reliably detects the low-abundance, cross-linked trimer despite the presence of much more abundant species.

The Refeyn Two^{MP} still offers all the important benefits of mass photometry – each experiment only uses minimal sample amounts, takes just minutes and the results can be intuitively interpreted.

KEY BENEFITS OF MASS PHOTOMETRY

- **Accurate measurement of true native behaviour**
 - In solution, in a variety of buffers and compatible with membrane proteins
 - Label free, without the need to modify samples
- **Information on all sub-populations in samples**
 - Single molecule counting
 - Wide mass range and high dynamic range
- **One assay format delivering multiple results**
 - Homogeneity, structural integrity and activity
 - Quick and simple to use
 - Minimal sample required

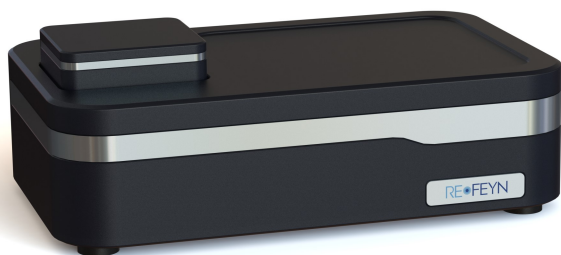


Fig. 3 The Refeyn Two^{MP} – second-generation mass photometry.

MEASUREMENT OF HIGH-MASS PARTICLES

The improved resolution of the Two^{MP} expands the usability of the instrument for the analysis of large, multi-component complexes (Fig. 2). It also improves performance in differentiating adeno-associated virus (AAV) particles that are loaded with gene cargo from empty ones (Fig. 4), providing quick and easy access to this critical parameter in process development for gene therapies.

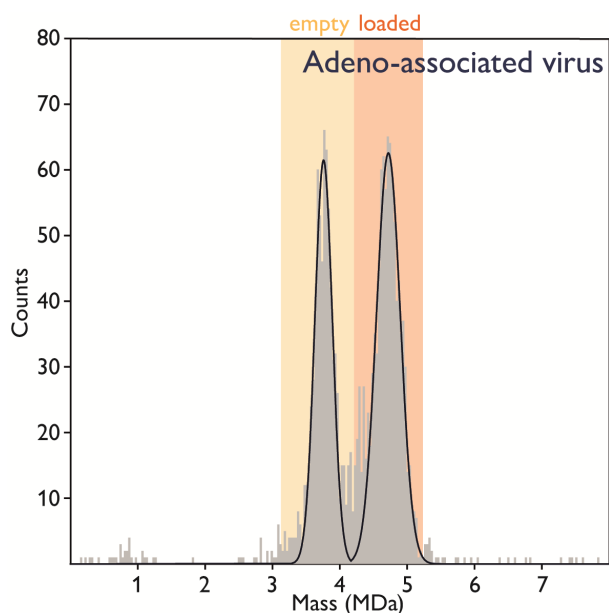


Fig. 4 Empty vs. full AAV particle analysis. The improved resolution of the Refeyn Two^{MP} improves differentiation of empty (~3.7 MDa) and DNA-loaded AAV capsids (~1 MDa mass increase).

IMPROVED STATISTICS

Mass photometry reliably quantifies relative concentrations of all sample species and can, therefore, be used to measure even complex, high-affinity molecular interactions directly in solution. The Two^{MP} makes these experiments easier as the improved statistics obtained in a single experiment allow for better quantification even of multistep binding mechanisms, as exemplified by our analysis of the interaction of the therapeutic antibody trastuzumab with its antigen Her2 (Fig. 5).

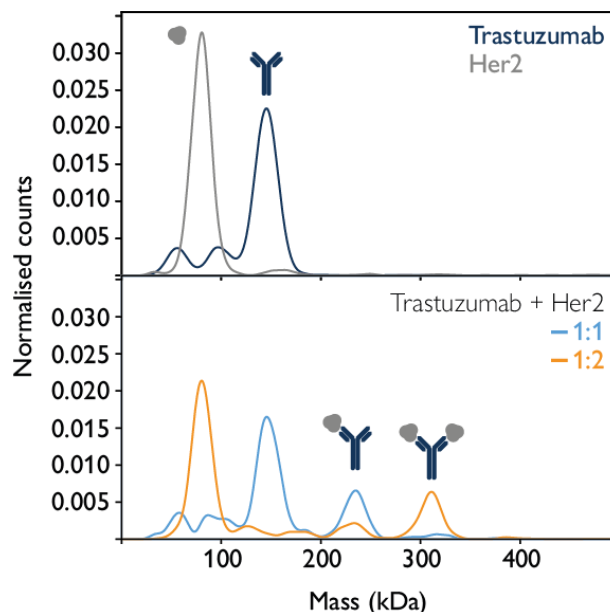


Fig. 5 Mass photometry can be used to quantify molecular interactions. Trastuzumab and its target, Her2, were measured individually and in mixtures, demonstrating MP's ability to quantify the interactions of individual antibody molecules with one or two target molecules.

Measuring molecular mass directly in solution enables investigation of a wide variety of biological systems. The Refeyn Two^{MP} provides this solution through MP with improved performance and unrivalled ease of use.

TWO^{MP} KEY SPECIFICATIONS

Mass range	30 kDa – 5 MDa
Resolution (FWHM)	25 kDa @ 66 kDa 60 kDa @ 660 kDa
Mass precision	± 2%
Mass error	± 5% (single measurement)
Concentration range	100 pM – 100 nM
Sensitivity	<< 1 ng of protein
Wavelength	488 nm
Field of view	4 × 11 μm (@ 500 Hz) up to 12 × 17 μm (@ 135 Hz)
Pixel size	12 nm

TWO^{MP} INSTALLATION REQUIREMENTS

- Instrument dimensions: 504 × 314 × 135 mm (WxDxH)
- Instrument weight: 30 kg
- Peripherals supplied with instrument: Electronics unit (430 × 330 × 133 mm, 10 kg), PC and monitor
- 4 power outlets: 100 – 250 V required
- Temperature: 20°C +/- 2°C, no direct air flow over the instrument
- Relative humidity: < 70% at 20°C