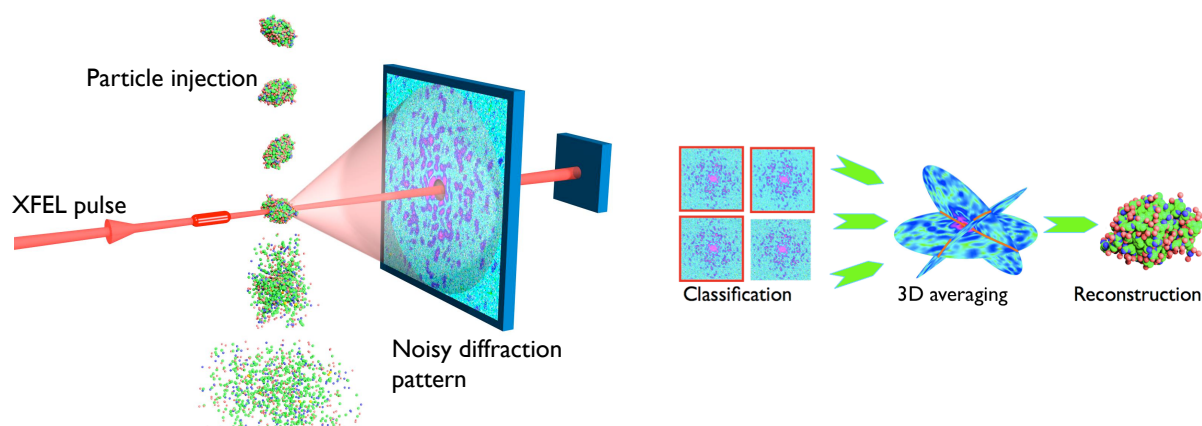


Data Rates for X-Ray Free-Electron Laser Imaging Experiments

Henry Chapman

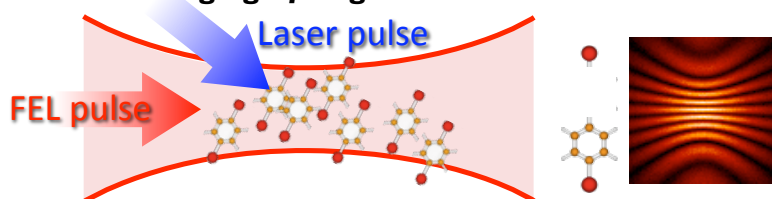
DESY-CFEL



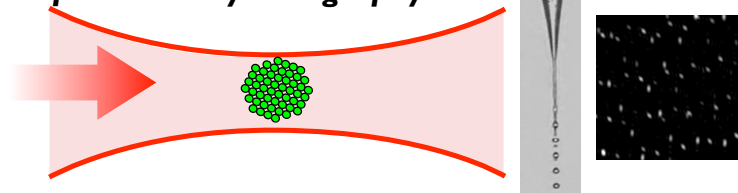
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Various imaging experiments have different data collection rates and quantities of data

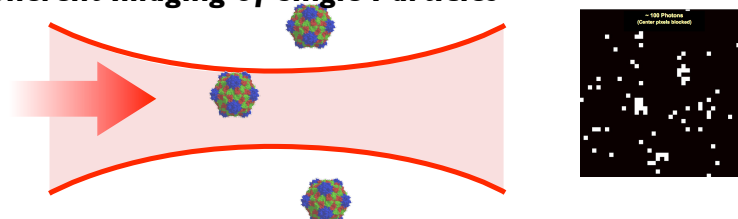
Coherent Imaging of Aligned Molecules



Ultrafast Nanocrystallography



Coherent Imaging of Single Particles



Frequency × pulses/train × hit efficiency	CCD frame (frames/ sample)	Data per sample (data per 6 day run)*
100 Hz × 1 × 1	256 × 256 128 kB (10 ⁷)	1 TB (4 TB)
100 Hz × 100 × 1	2k × 2k 8 MB (10 ⁵)	1 TB (100 TB)
100 Hz × 1000 × (10 ⁻⁴ -10 ⁻²)	1k × 1k 2 MB (10 ⁶)	20 TB (1 PB)

*factoring sample change

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