

## Technology Summary

This document gives a quick overview on the Microscale Thermophoresis (MST) technology and available instruments:

### Microscale Thermophoresis (MST)



Microscale Thermophoresis is based on a physical principle, used for the first time for biomolecular interaction studies. It measures changes of the mobility of molecules in microscopic temperature gradients. The technology is exceptional sensitive since it detects changes in size, charge and hydration shell of molecules. NanoTemper provides three Monolith series instruments based on MST:

- **Monolith NT.115 and NT.115Pico**, which measure thermophoresis of fluorescently labeled molecules.
- **Monolith NT.LabelFree**, which measures thermophoresis by intrinsic tryptophan fluorescence.

NanoTemper's MST technology has the following key benefits:

- **fast:**  $K_d$  in 10 minutes, results in real time
- **rapid assay optimization**
- **broad application range:** from ion and fragment binding to interactions of ribosomes and the like
- **assay diversity and robustness:** measure in any buffer as well as complex bioliquids
- **high information content:** straightforward detection of aggregation
- **access to physical parameters:** affinity, stoichiometry, binding energetics
- **low sample consumption:** < 4  $\mu$ l sample as low as pM concentrations
- **free solution measurement:** no surface immobilization necessary
- **label-free**, or excellent selectivity using a fluorescent dye
- **dynamic range:** pM/nM to mM  $K_d$ -range
- **maintenance-free platform**
- **straightforward handling:** simple sample preparation and intuitive software user interface

## Comparison Monolith Instruments



dynamic range: 1 nM to mM

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broad application range: from ions to ribosomes

buffer independency: including serum or cell lysate

purification free: fluorescent fusion proteins

dynamic range: 10 pM to mM

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broad application range including very strong binding affinities

buffer independency: including serum or cell lysate

purification free: fluorescent fusion proteins

dynamic range: 10 nM to mM

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label-free: intrinsic fluorescence

buffer independency: except complex biofluids

pure samples

Instruments Monolith NT.Series	NT.115	NT.115Pico	NT.LabelFree
Affinity range	1 nM to mM	10 pM to mM	10 nM to mM
Volume per measurement	< 4 µl	< 4 µl	< 4 µl
Concentration of fluorescent molecule	10 <sup>-9</sup> - 10 <sup>-3</sup> M	10 <sup>-11</sup> - 10 <sup>-3</sup> M	10 <sup>-8</sup> - 10 <sup>-3</sup> M
Samples per run	16 samples	16 samples	16 samples
Molecular weight range (Da)	10 <sup>1</sup> - 10 <sup>7</sup>	10 <sup>1</sup> - 10 <sup>7</sup>	10 <sup>1</sup> - 10 <sup>7</sup>
Time for experiment & analysis	minutes	minutes	minutes
Range of accessible interactions	■■■■■	■■■■■	■■■
Immobilization	No	No	No
Labeling required	Yes	Yes	No
Tryptophane fluorescence required	No	No	Yes
Measurements in complex biofluids (serum, cell lysate)	Yes	Yes	No
Temperature control	22 - 45°C	22 - 45 °C	22 - 45 °C
Maintenance required	No	No	No
Fluorescence channels per instrument	2 (BLUE, RED or GREEN)	1 (RED)	1 (UV)

■■■■■ very broad application range  
 ■■■■ broad application range limited by an intrinsic fluorescence of a binding partner