Particle Time-of-Flight by Hadamard Transform (ePToF): A new high-duty-cycle approach to size-segregated and total aerosol mass measurements for the Aerodyne Aerosol Mass Spectrometer

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Signal and PToF for both PToF and ePToF

Beam Open/Closed at 104 Hz

NOTE: traces are not apples to apples S/N comparisons
Size distributions at different S/N

- m/z 28, 100 µg m⁻³, 32 s
- m/z 104, 8 µg m⁻³, 32 s
- m/z 105, 0.85 µg m⁻³, 32 s
- m/z 106, 0.15 µg m⁻³, 32 s

S/N for m/z 106:
- PToF: 2
- ePTof, Matrix: 7
- ePTof, Tofwerk: 100
New Acquisition Mode

GenAlt

- MS Open
- MS Closed
- PToF

New GenAlt

- ePToF
- MS Closed
- ePToF
- MS Closed

- Size and total mass are taken simultaneously with similar duty cycle, no normalization factor
- By using size resolved data at high S/N, fragtable becomes mostly superfluous
WINTER Campaign, RF03

1 min cycles:
6 s FMS Closed
46 s FMS Closed
~5 s ePTofF

If everything works, ePTofF should have similar S/N as a 2 s average of the MS Data!
First Test: Nitrate, total ePToF signal

You can normalize PToF with its own data!
However...

Once DC markers are applied, the ePTToF signal becomes much noisier!
NOTE: This does not apply to the advanced inversion algorithm discussed by Leah Williams
Removing DC Markers solves the problem
Works for other species as well
Some issues still present with OA

Likely software related, stay tuned.