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THE 25th IIR INTERNATIONAL
CONGRESS OF REFRIGERATION
August 24-30 | Montréal, Québec, Canada



Hosted by



ACOUSTIC EMISSIONS AND NOISE ABATEMENT OF AIR TO WATER HEAT PUMPS // PART1

Acoustics of Heat Pumps

Workshop, 29.08.2019



Acoustic Signatures
of Heat Pumps

IEA HPT

Annex 51

Christoph Reichl, Peter Wimberger, Felix Linhardt, Johann Emhofer



CONTENT

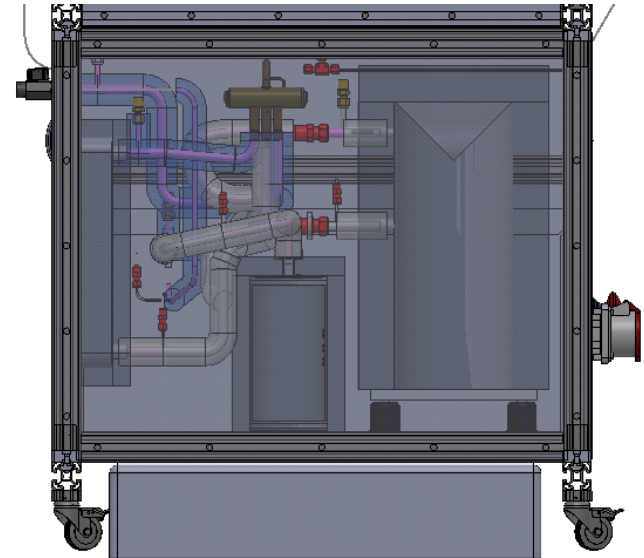
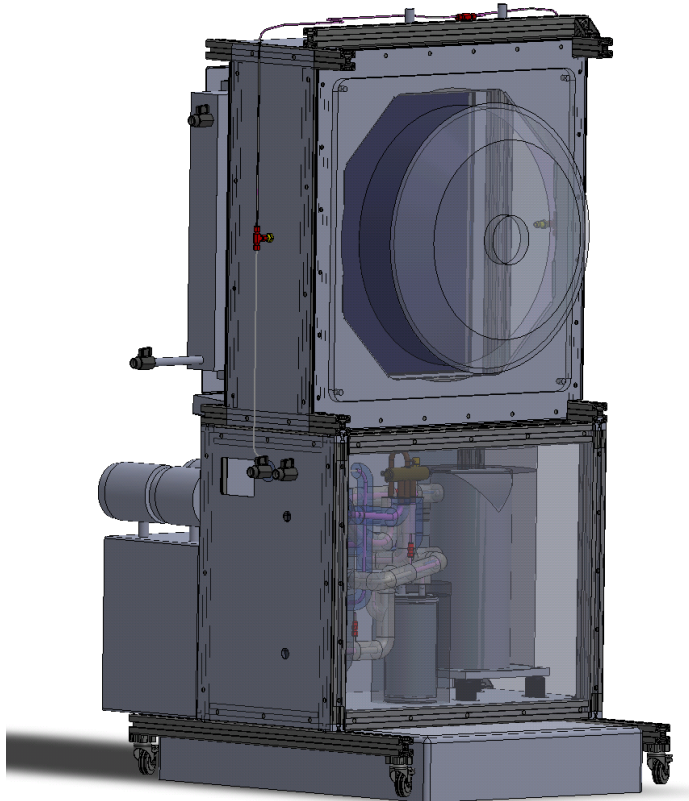
AIM OF WORK

METHODS

RESULTS

DOWNLOAD

SUMMARY.



AIM OF WORK

We aimed at **developing** respectively **adapting advanced numerical and experimental methods** for the assessment of **noise-reducing measures** for **air-water-heat pumps** to support heat pump manufacturer in developing low-noise heat pumps.



We worked on a **set of quantitatively assessed measures** for **known and innovative noise reduction actions** evaluated on an energetic and noise level.

Results from the Austrian national project SilentAirHP will be the base for this presentation.





METHODS

Experimental Methods

- Acoustic Dome
- Acoustic Beamforming
- Correlated Acoustics-Vibrations-Flow Measurements

Numerical methods

- Noise propagation simulations
- 1D model of the heat pump including acoustics

ACOUSTIC DOME – TRANSIENT SOUND POWER LEVEL



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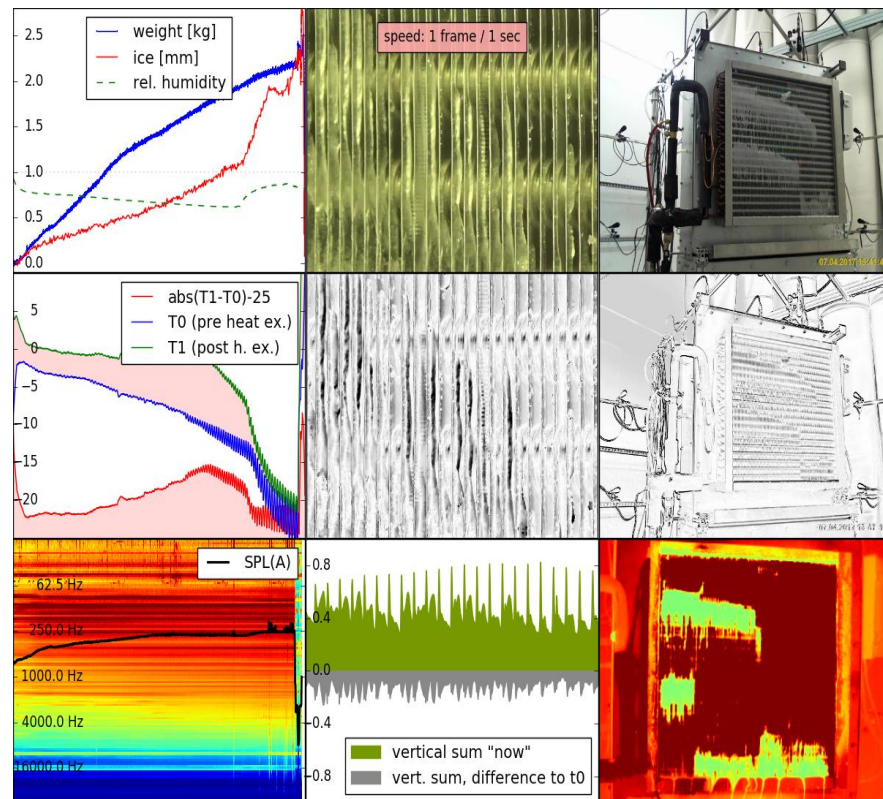
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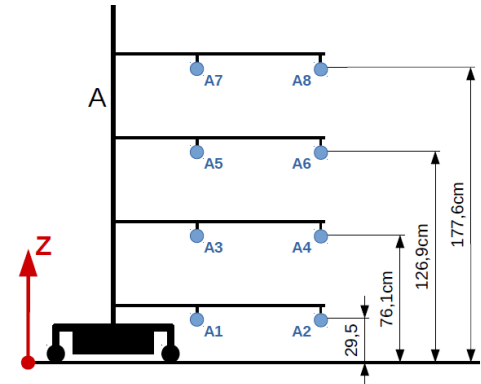
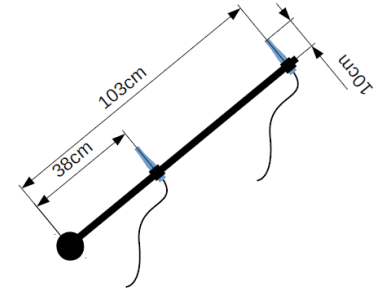
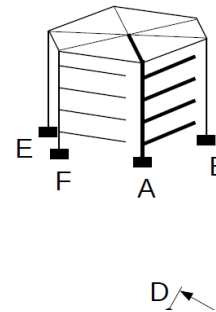
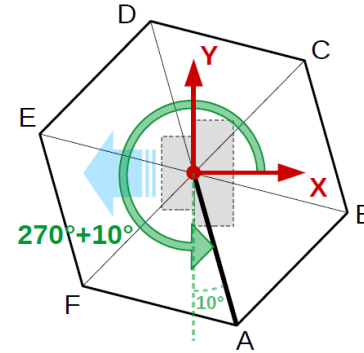
ACOUSTIC DOME – TRANSIENT SOUND POWER LEVEL



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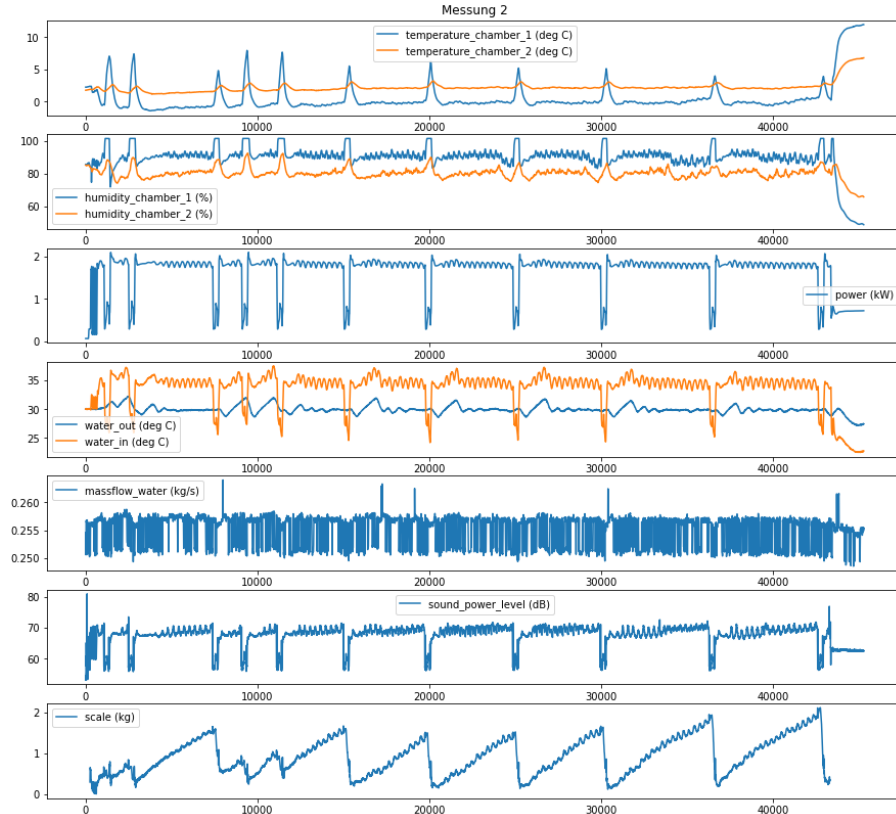


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Typical data-set of a
heat pump measurement
with the acoustic dome.



ACOUSTIC DOME – TRANSIENT SOUND POWER LEVEL



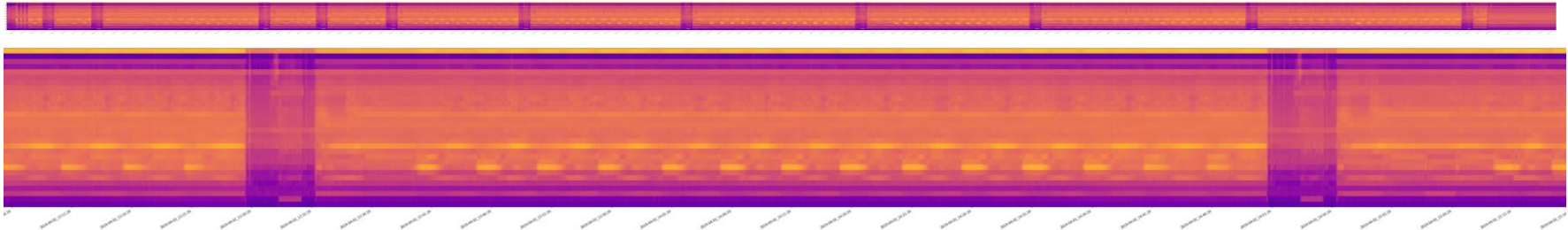
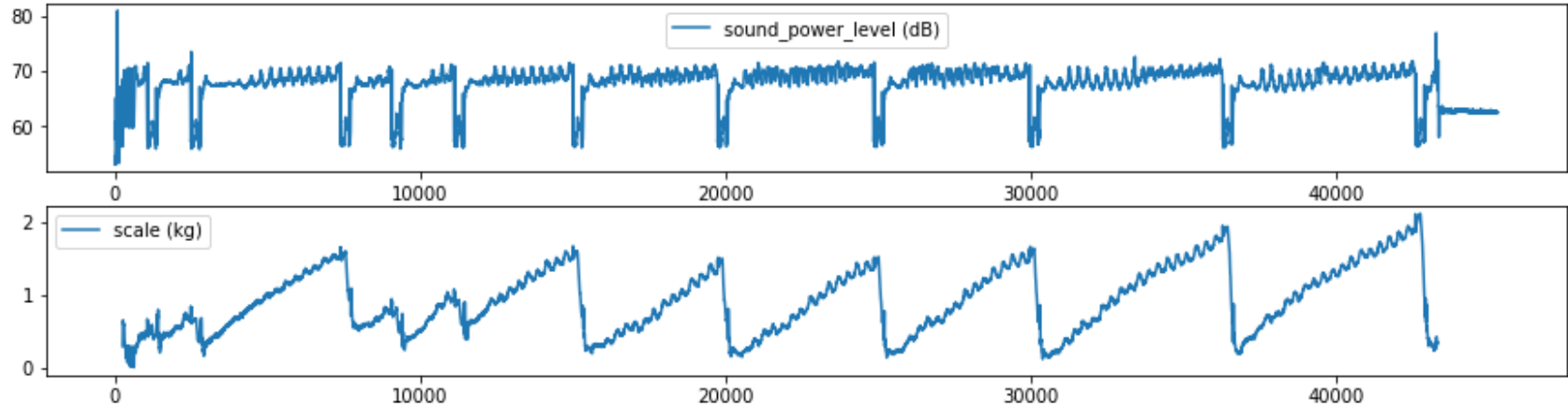
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ACOUSTIC DOME – TRANSIENT SOUND POWER LEVEL

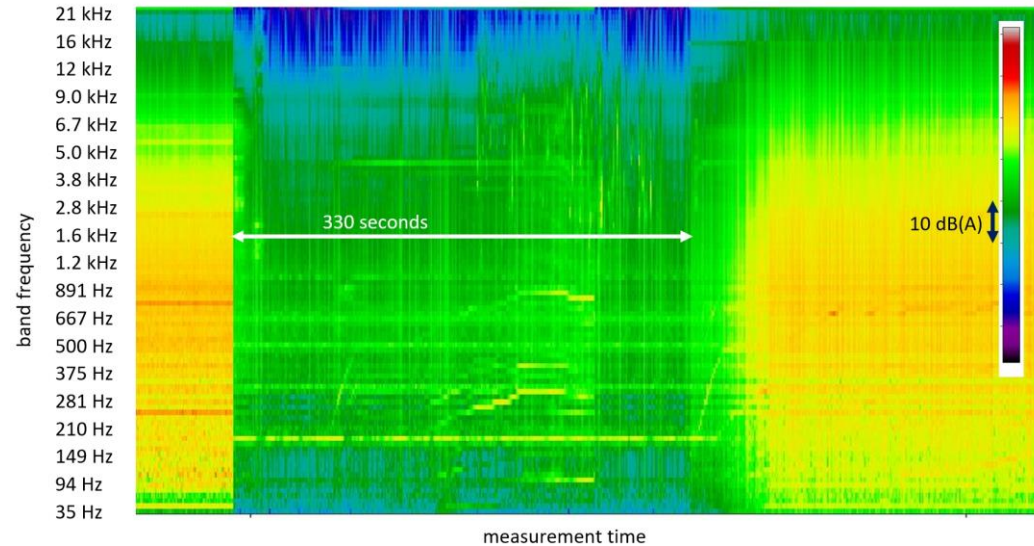
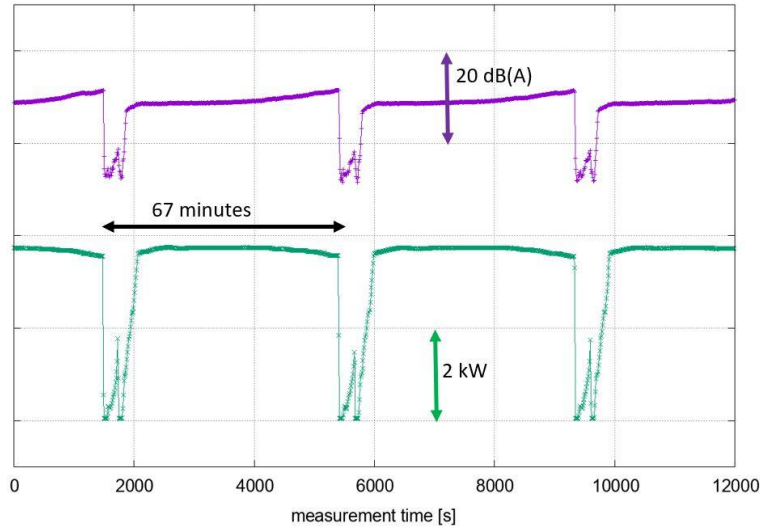


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Sound power level time series & frequency spectra



ACOUSTIC DOME – TRANSIENT SOUND POWER LEVEL

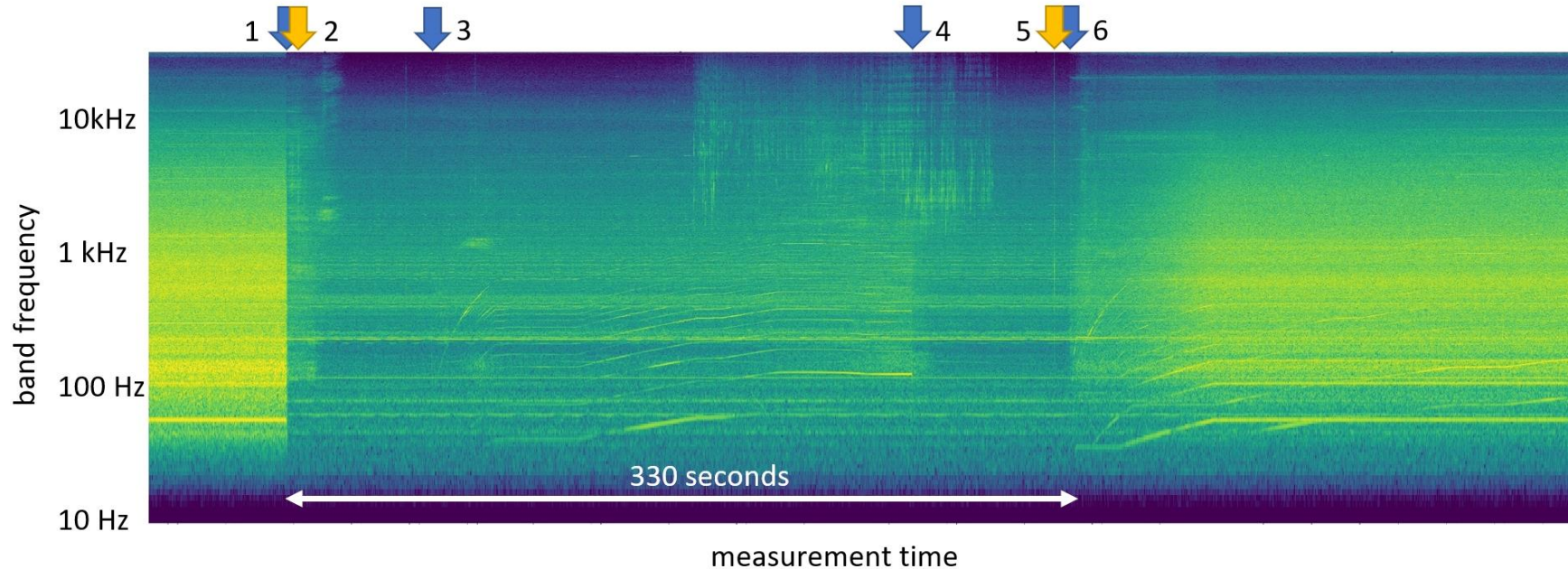


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Frequency spectra



ACOUSTIC BEAM FORMING – SOUND SOURCE DETECTION



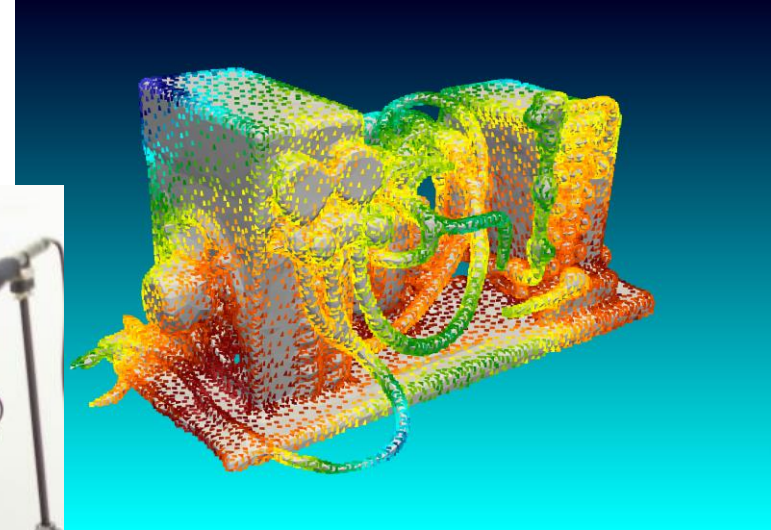
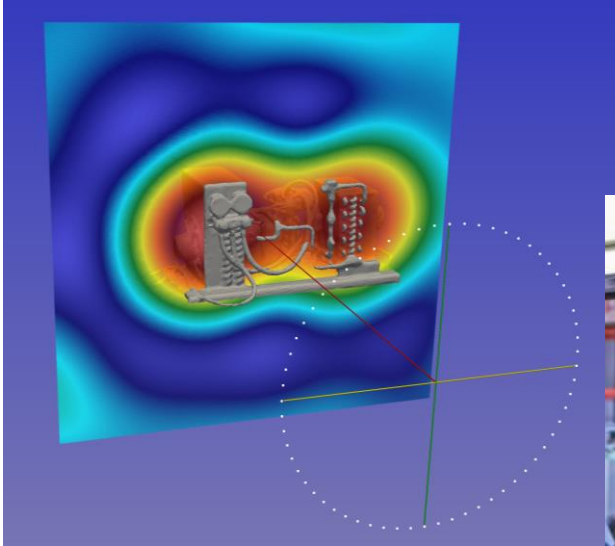
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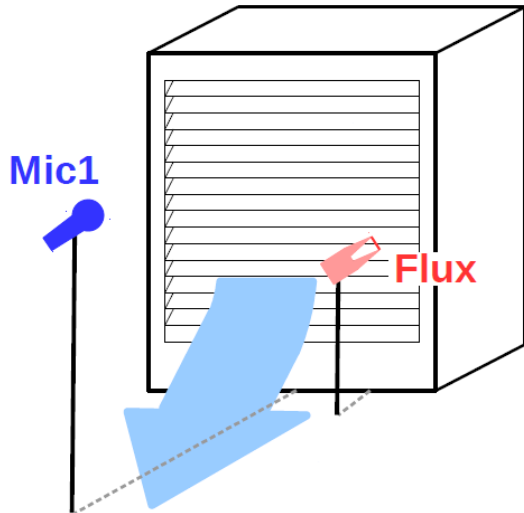


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CORRELATED ACOUSTICS – VIBRATION & FLOW

outside part of heat pump



inside part of heat pump

