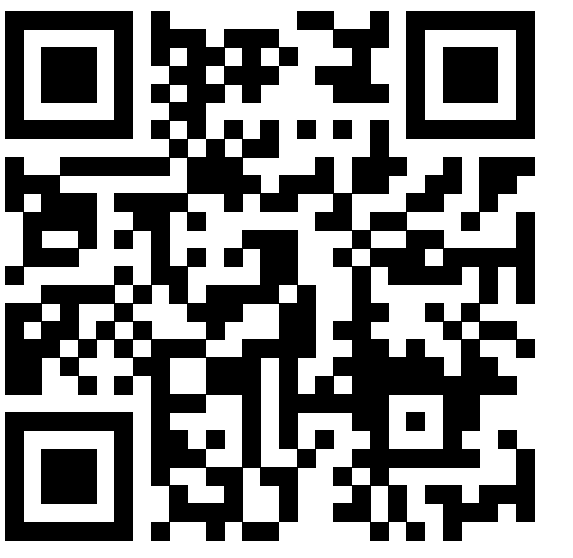


Silent people are surprisingly loud! (because their presence alters room acoustics)

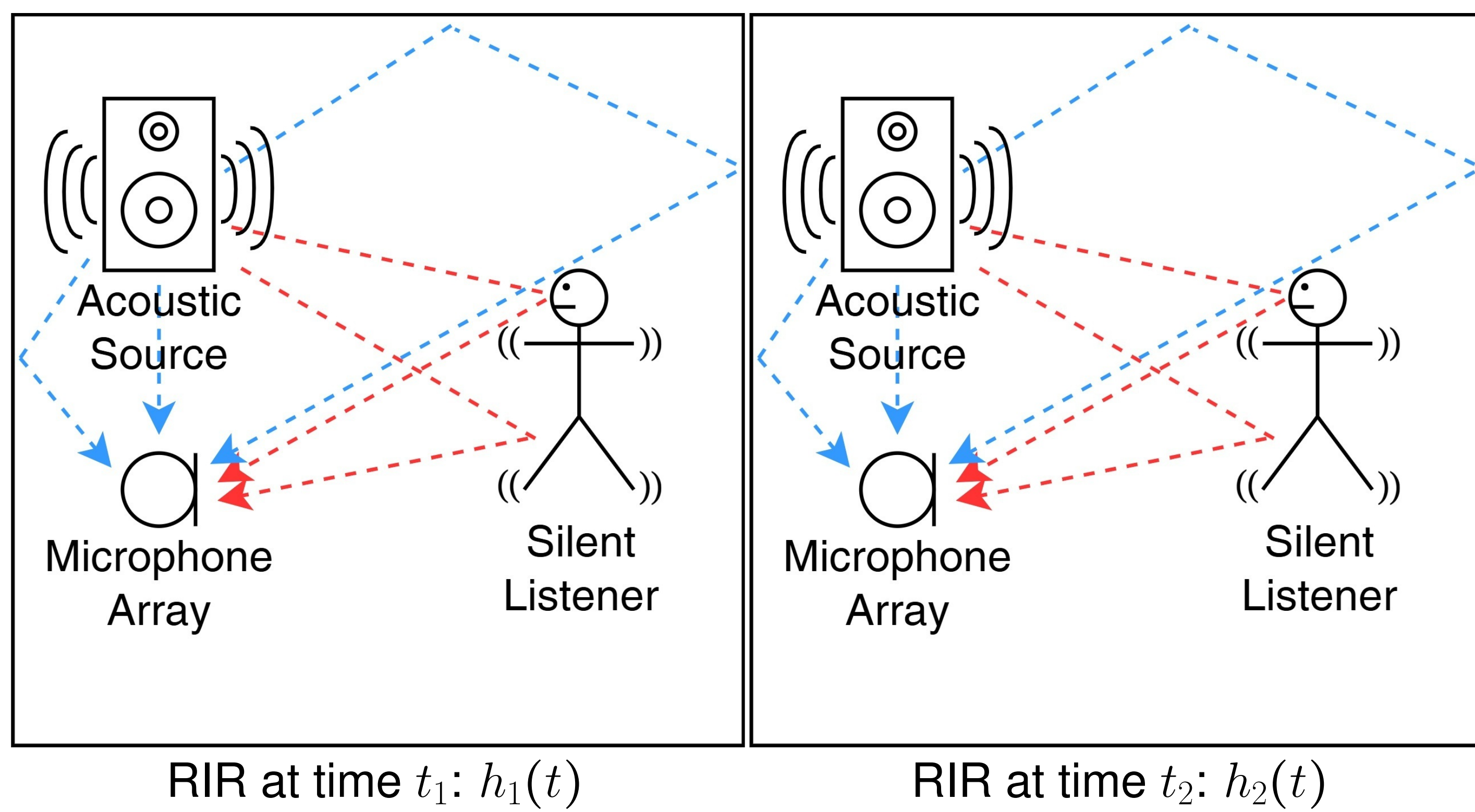
SuRIR: A Dataset of *Successively* Measured RIRs for Localizing Silent Humans

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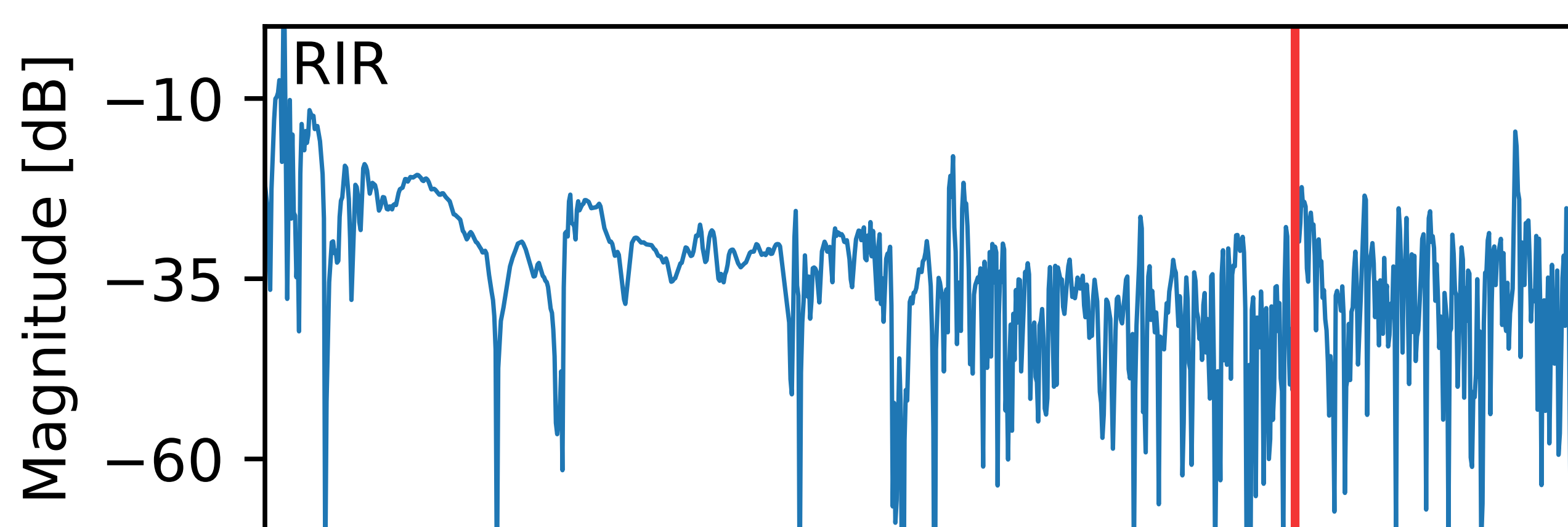
1. Introduction



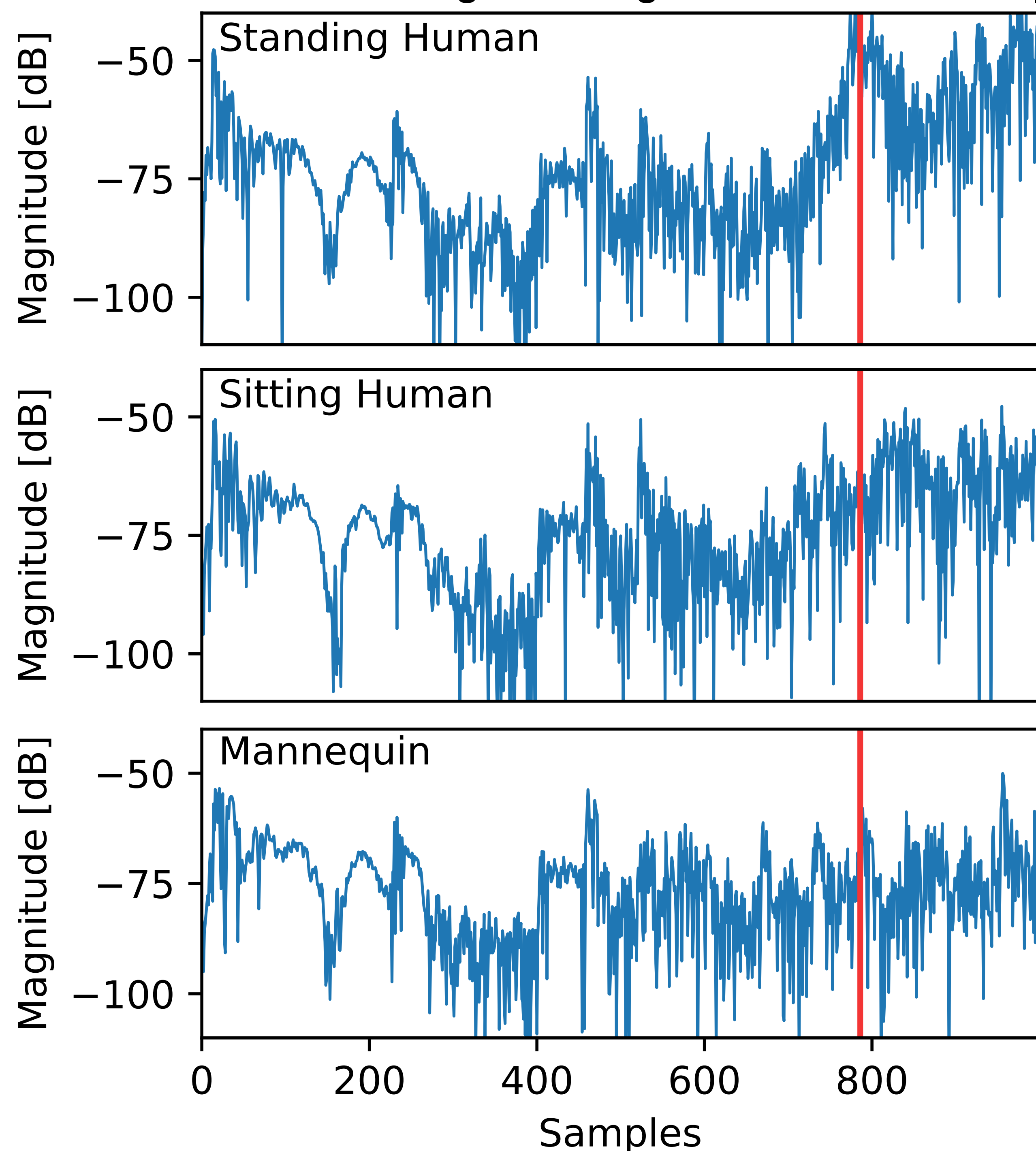
- Human micromotion alters the **red** acoustic paths, whereas the **blue** ones remain unchanged, allowing for localization of silent humans
- Differential RIR** $\Delta h(t) = h_1(t) - h_2(t)$ reveals the human's location

2. Real-World Example

RIR with **red** line indicating a reflection caused by a human:

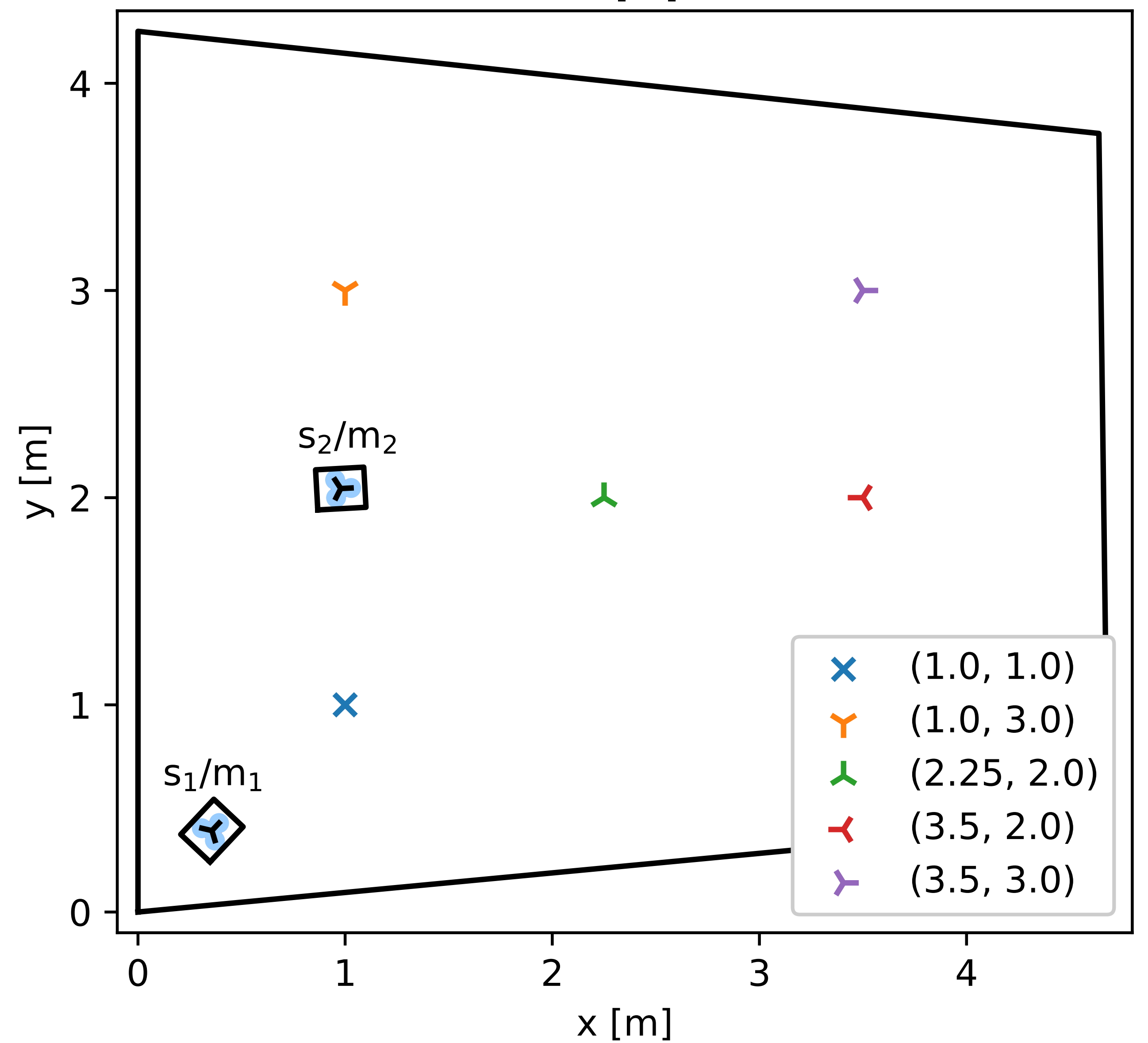
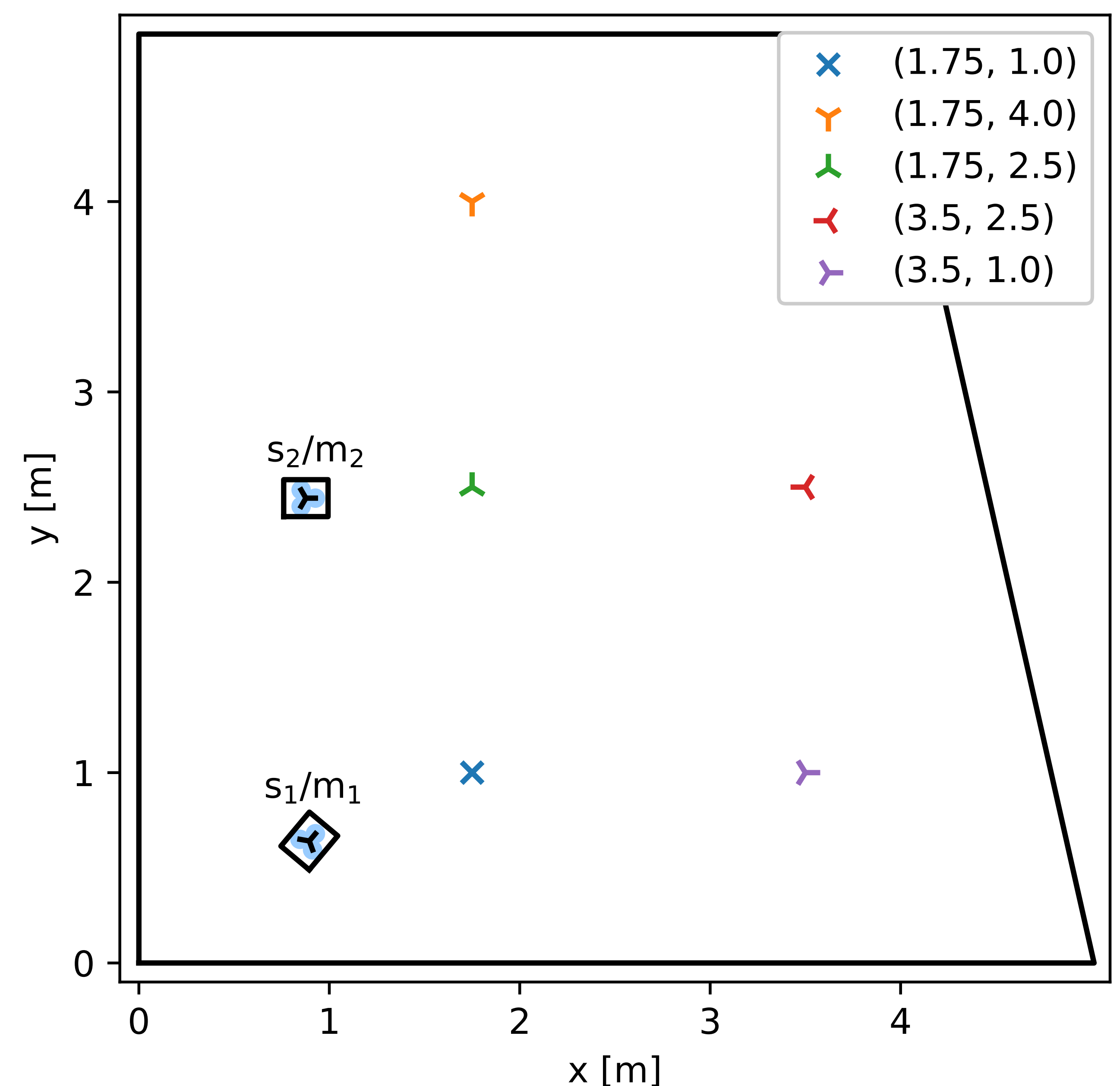


Differential RIR for a standing vs. sitting human and a mannequin:



- The shape of the differential RIRs follow the shape of the RIR, **unless a human is present in the room**
- Standing humans produce more "noise" than sitting humans

3. Dataset



- 600 unique scenarios** (2 sweep lengths x 3 participants x 5 positions x 5 motion conditions x 2 loudspeakers x 2 rooms)
- 6 microphones captured **4 successive RIRs per scenario**
- $\Rightarrow$ **14,400 RIRs** with humans + **960 RIRs** with a mannequin present

4. Conclusions

- SuRIR is the **first dataset with successive RIR measurements** for identical scenarios
- Enables localization of silent humans** through micromotion
- Supports development and benchmarking of RIR-based algorithms under real-world variations