



# Skull-shaped antenna enables near-field super-resolution in acoustic source localization using elastic waves

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Questions? Ask this guy!



Curvilinear abscissa p [cm]

Acoustic source

distance



Experimental setup of sound source in front of skull with piezoelectric discs glued to it





## Discussion

•We are able to estimate the source position in the near-field with a resolution below the diffraction limit (~1/4 of wavelength) for frequencies in the physiological hearing range (up to 6kHz).

•We infer that anatomical details of the skull give rise to complex features of the skull's Green's function enabling super-resolution localization.

•The role of the skull is presumably particular relevant in marine mammals, owing to the effectiveness of energy transfer from water to bones.

•We are currently investigating this phenomenon on dolphin skulls.

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## References

•Catheline, Stefan, et al. Acoustic source localization model using in-skull reverberation and time reversal. Applied physics letters 90.6 (2007): 063902.



Please feel free to attend my talk on Friday 3:50 PM - 4:05 PM: 5pSP11. Numerical simulations of sound source localization with two-dimensional bio-inspired antennas of varying geometric complexities





