Charge Distribution of Ejected Particles after Impact Splash on Mars: A Laboratory Approach

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Experiment

Analyzing acceleration of individual grains, ejected from saltating impacts, in a homogeneous electric field.

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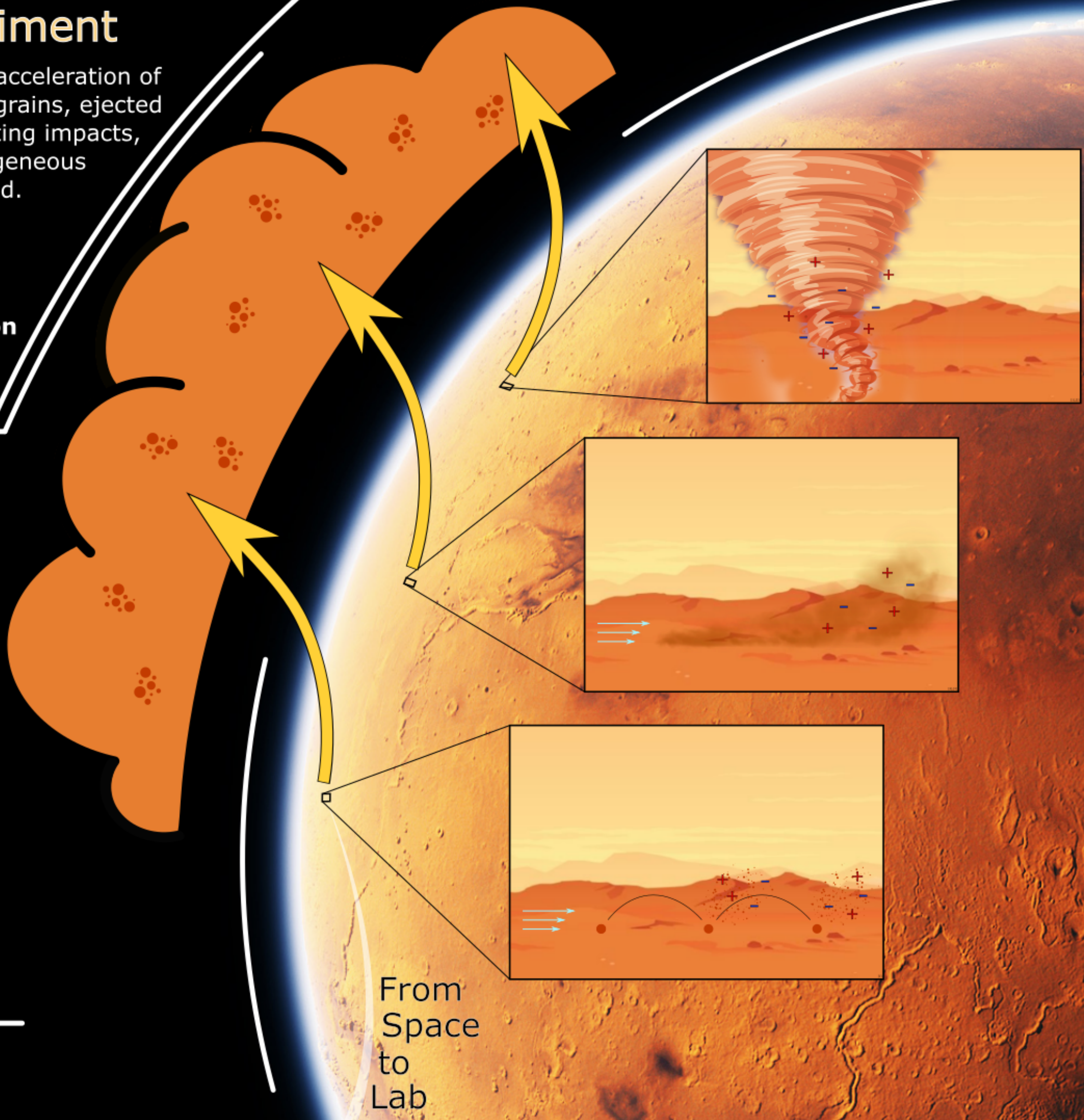
Charge Distribution



Setup

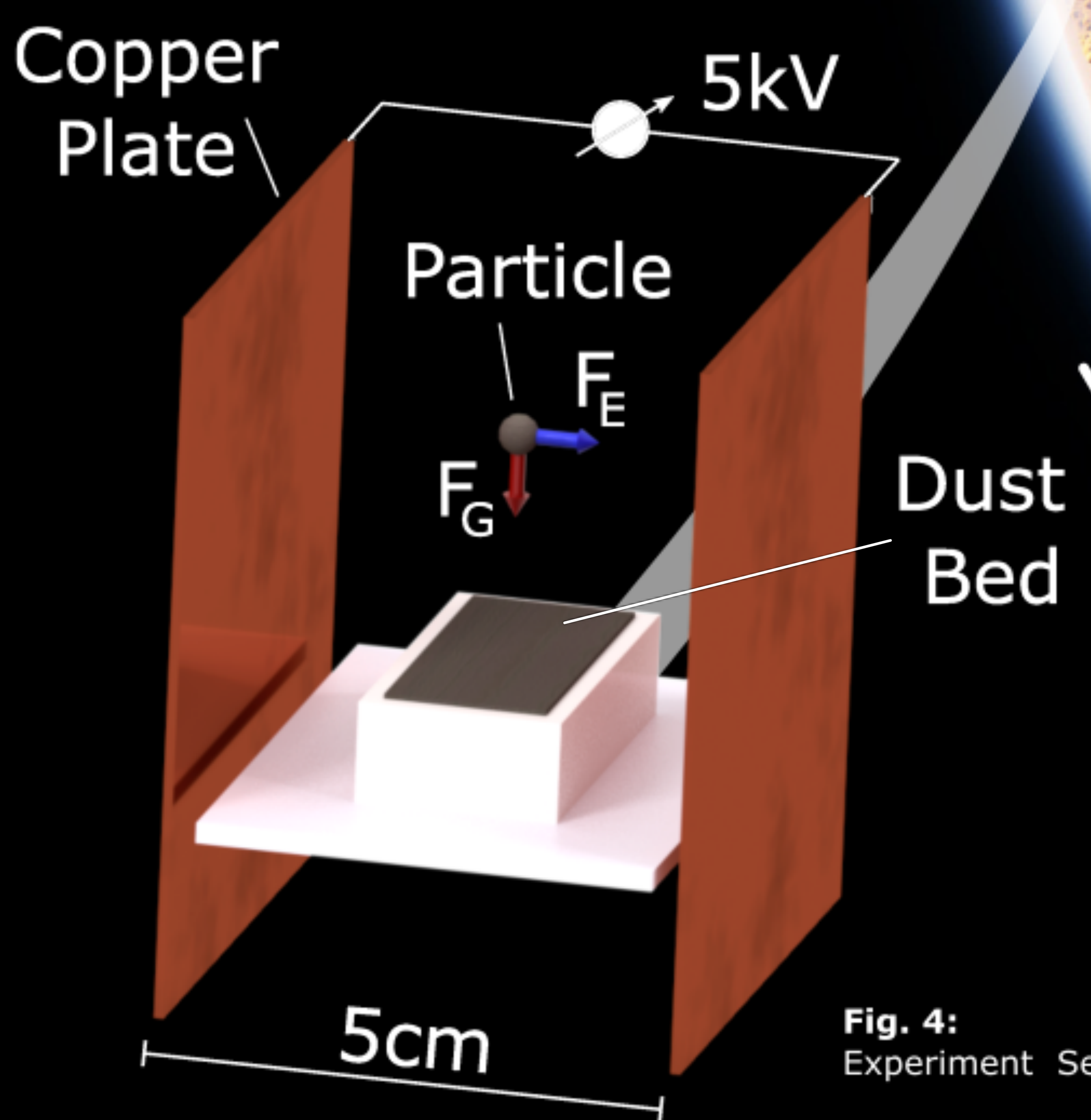


Fig. 4: Experiment Setup

Results

Fig. 1-3 show the charge distribution of 283 individual particles.

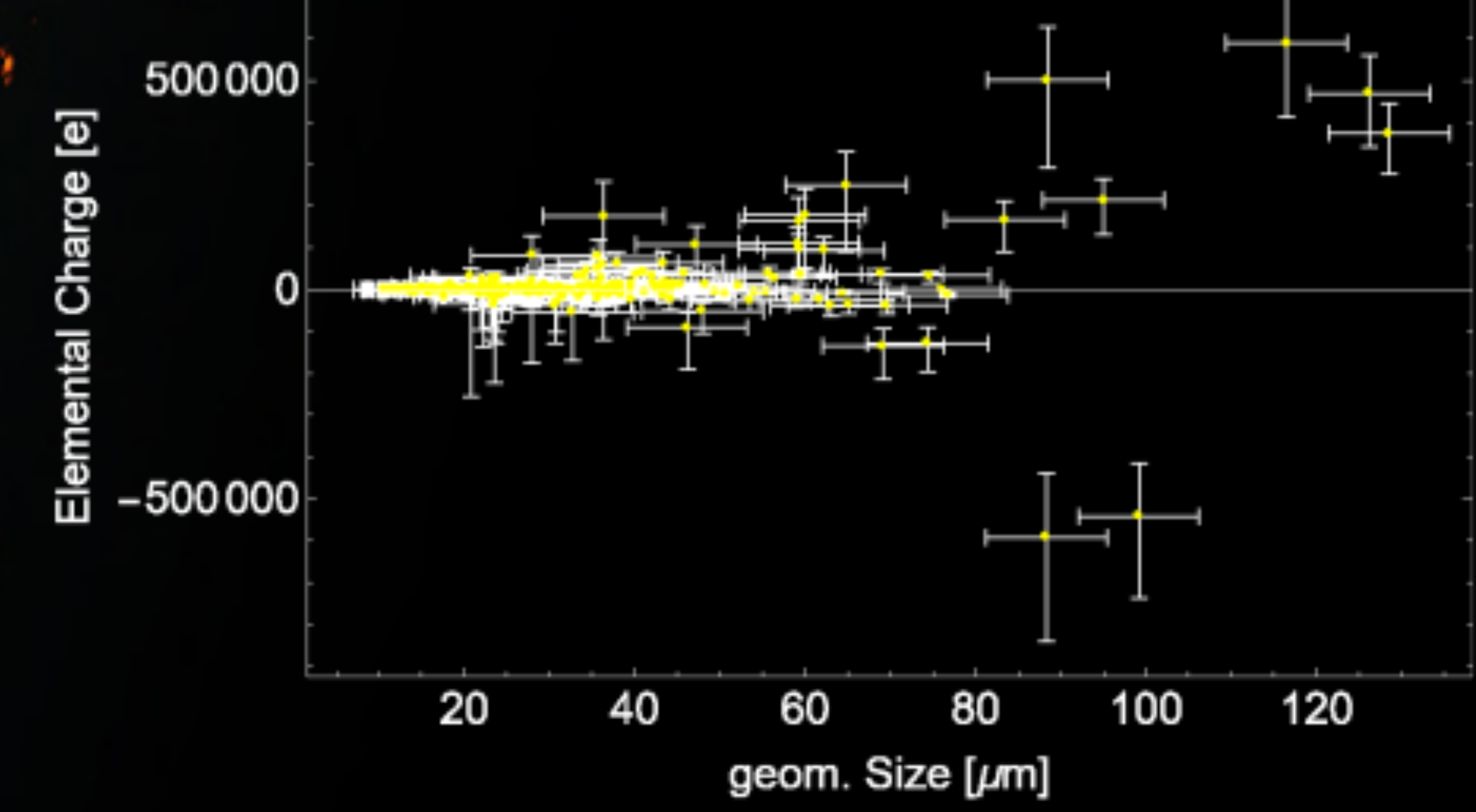


Fig. 1: Distribution of absolute charge

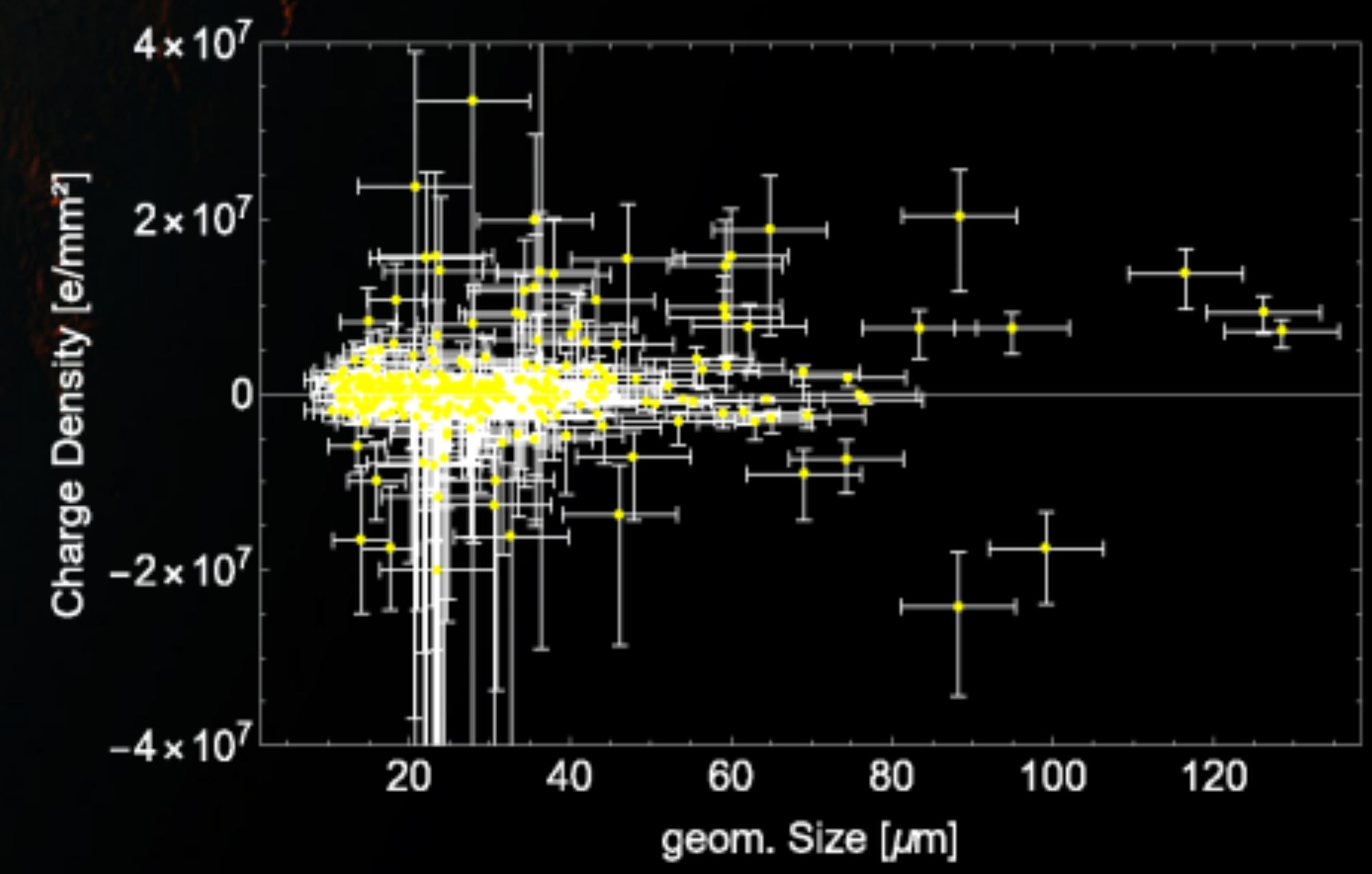


Fig. 2: Distribution of charge density

- Values for the charge density are within an expected range for collisions between dust grains[4].
- In the binned data we see a bias toward positive charges.

➔ negative charges possibly tied to smaller dust grains (~10 µm resolution limit)

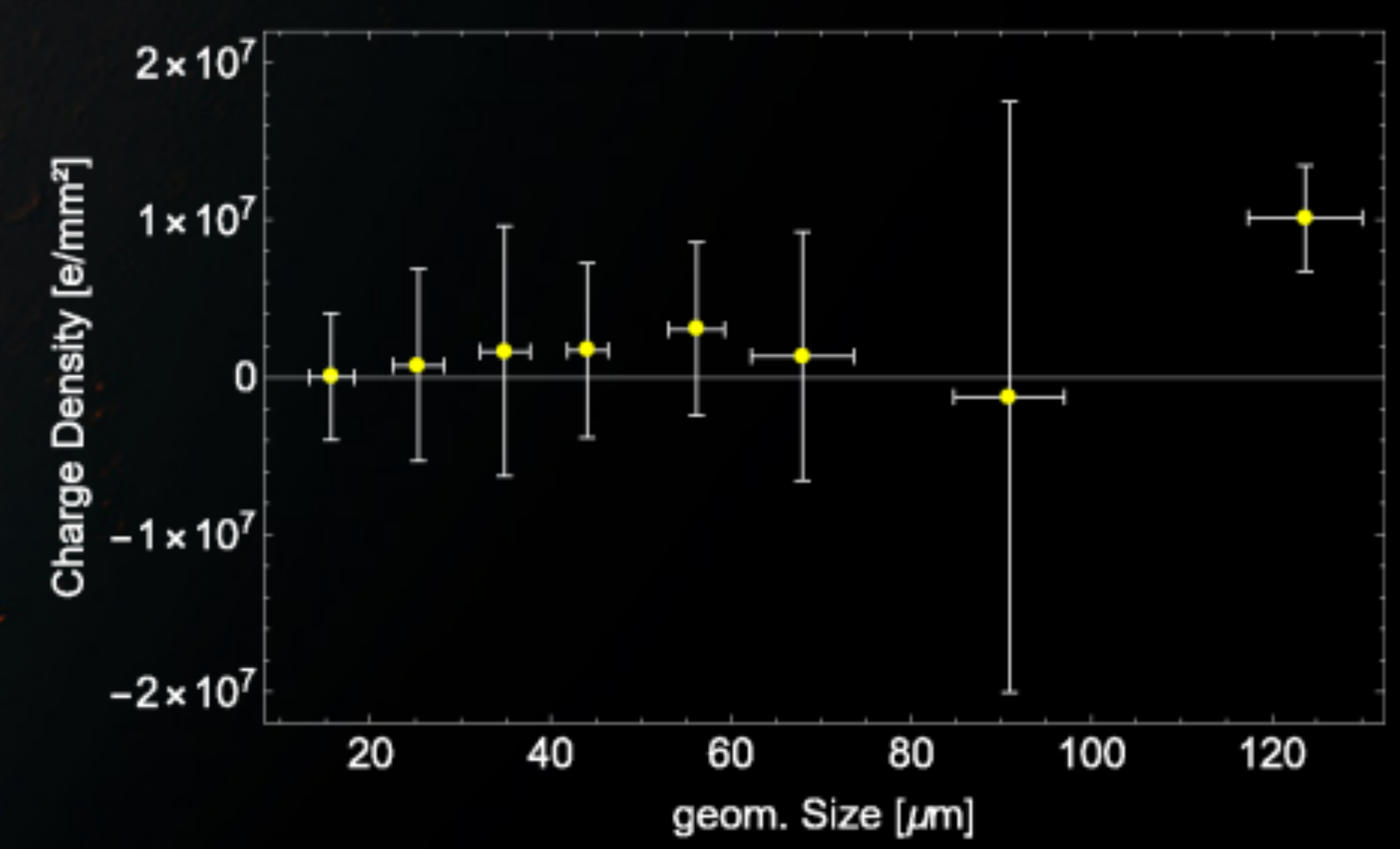


Fig. 3: Binned charge density

Majority of particles carry (large) net charge right after ejection

- Subject to lifting or restraining in electric field
- Possible shift in threshold shear stress

[1] Picture from: https://favpng.com/png_view/red-tornado-red-tornado-tropical-cyclone-png/ahYkRAqa (07.08.2024, 17:28)
[2] Adapted from image by Halina lakatosh from: https://www.istockphoto.com/de/vektor/marslandschaft-hintergrund-gm827511944-134865007 (07.08.2024, 17:42)
[3] Picture by Mentalmind from: https://www.vectorstock.com/royalty-free-vector/brown-dust-plume-cloud-with-white-copy-space-vector-30346374 (08.08.2024, 15:38)
[4] Onyeagusi, F.C., Meyer, C., Teiser, J., Becker, T. & Wurm, G. 2024, Atmosphere, 14, doi: 10.3390/atmos14071065
Background Picture: by erinz, from: https://wallpapersafari.com/w/aXQ0zJ (07.08.2024, 16:20)

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