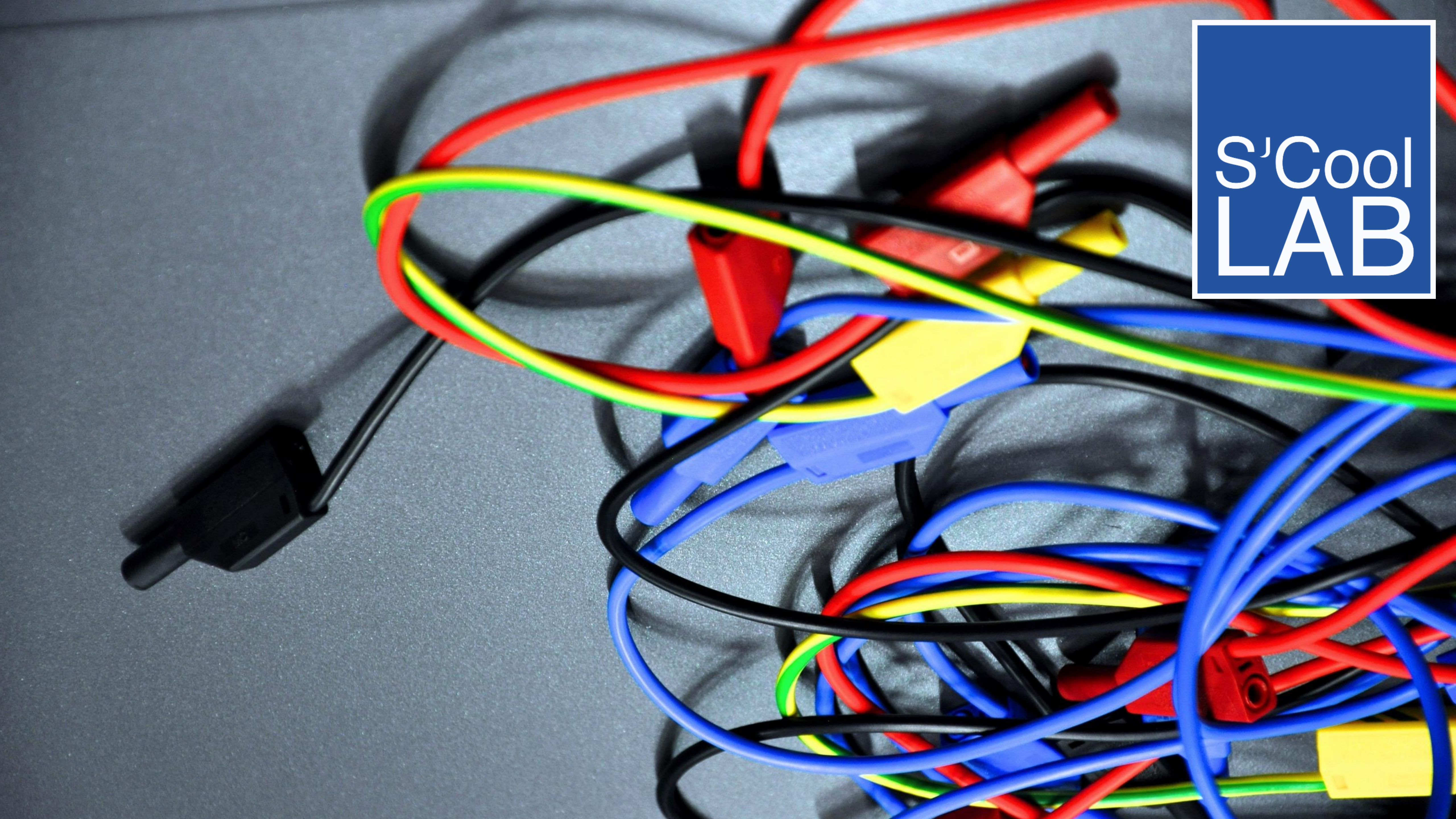
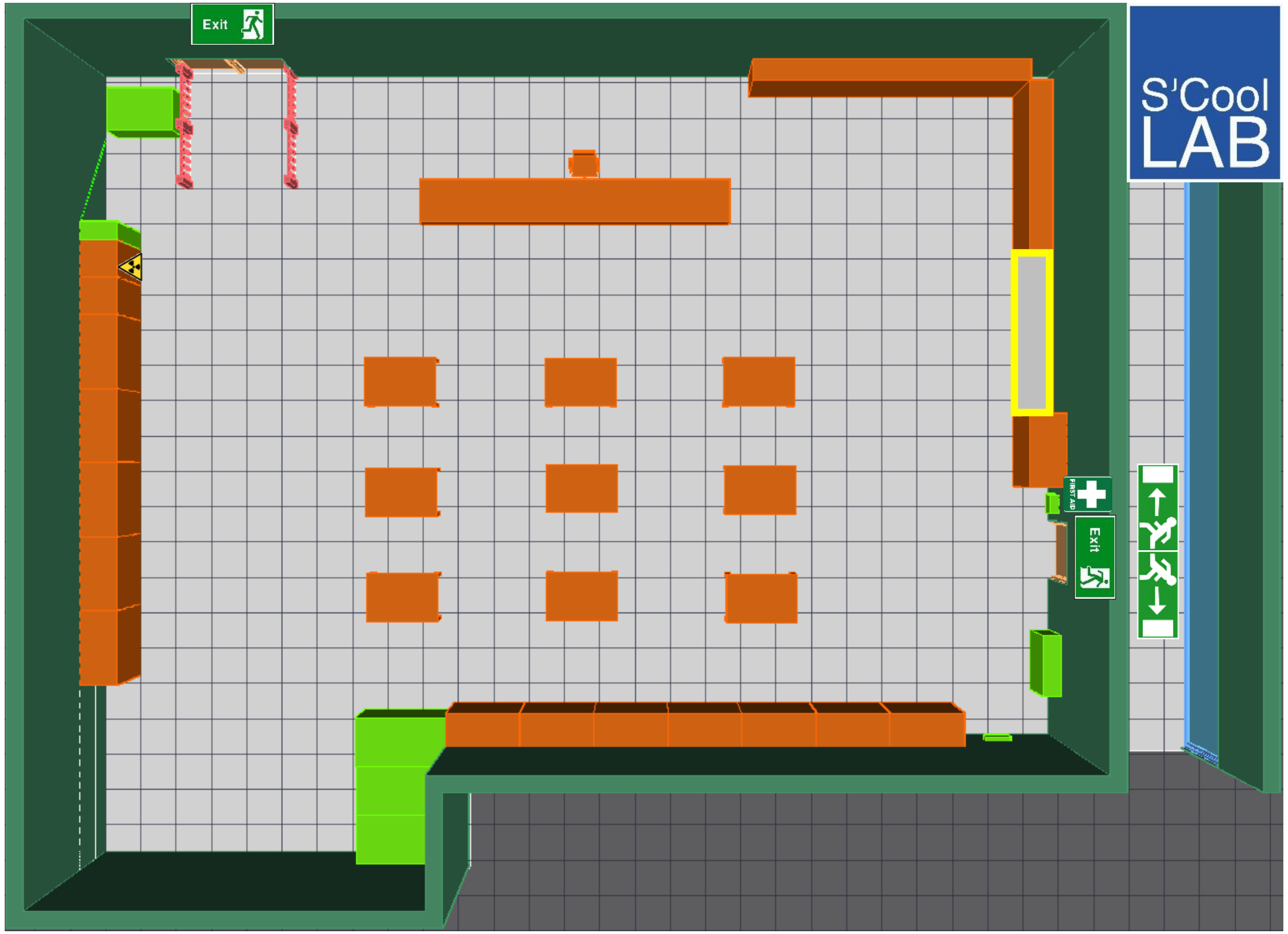

S’Cool
LAB

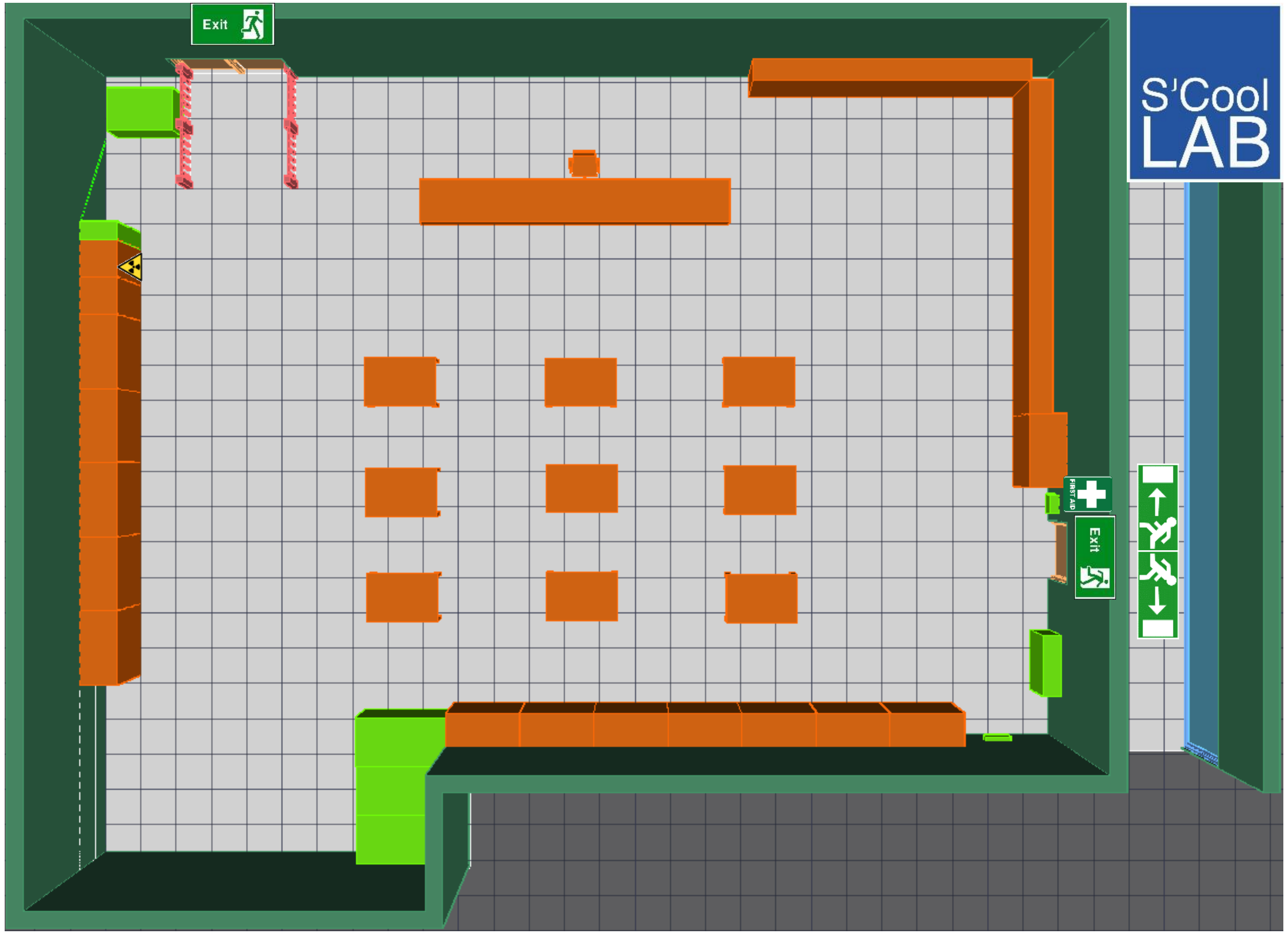
Rules in S‘Cool LAB

Bags

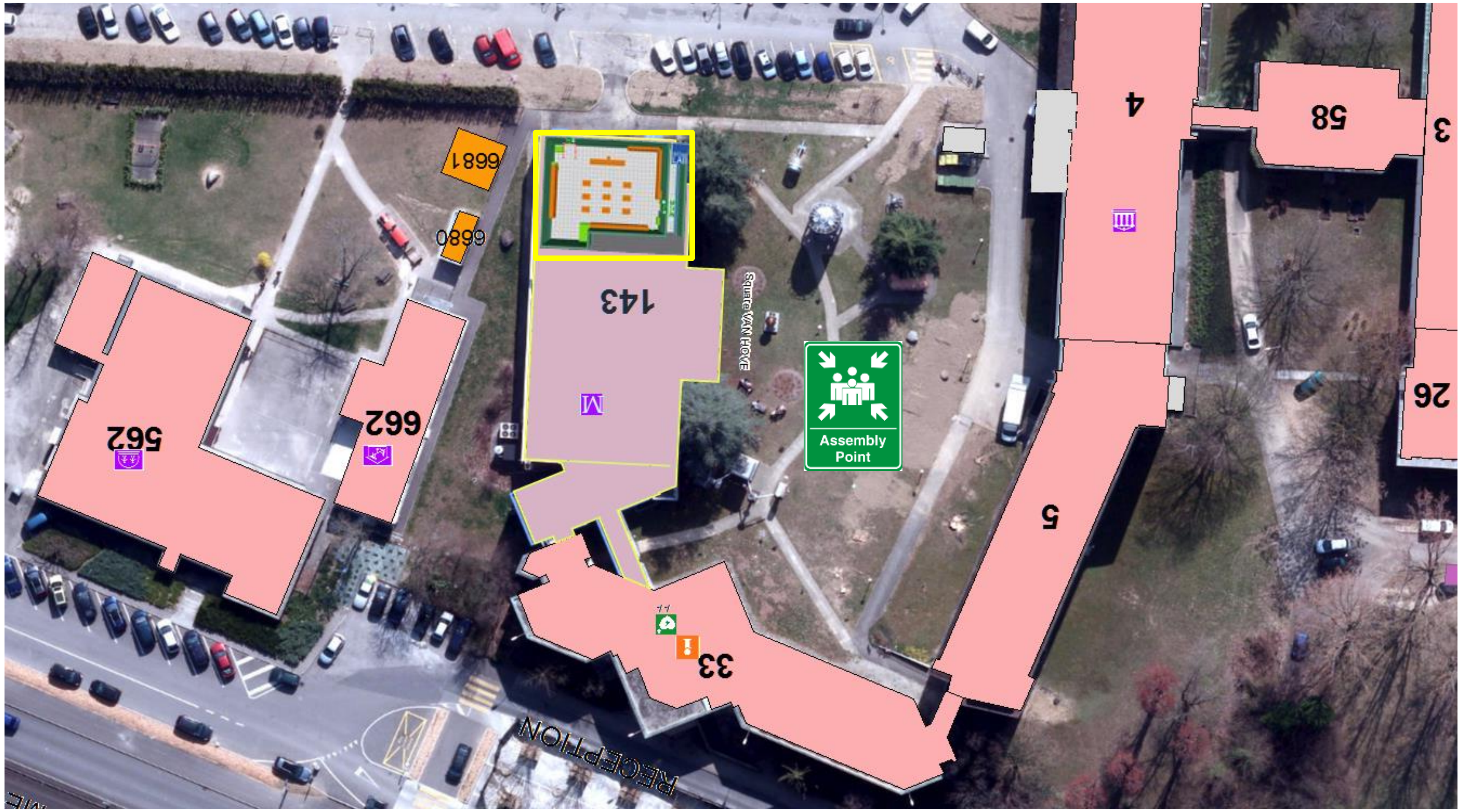
To avoid collisions, please place your bags and jackets in the designated shelf!



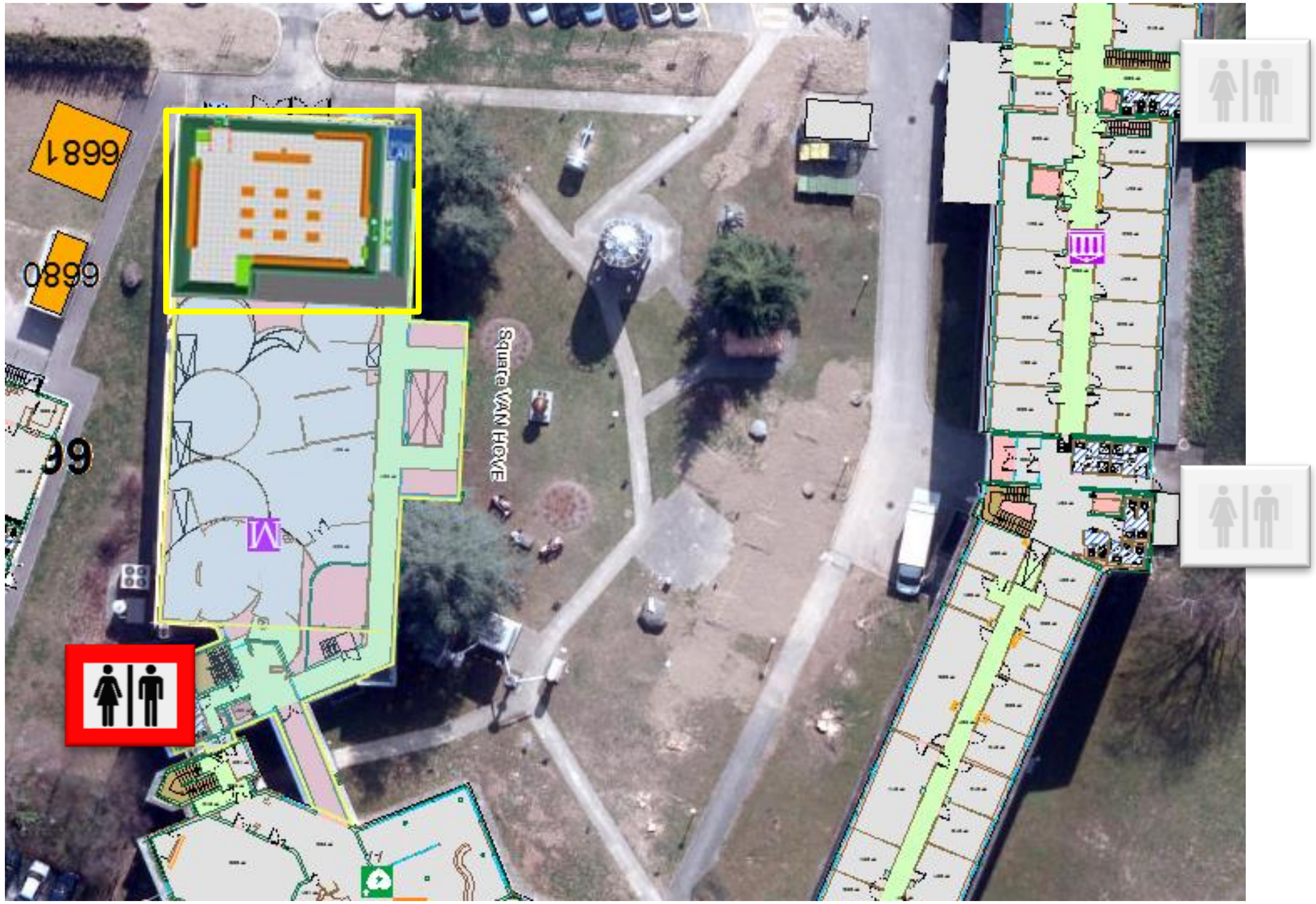
Emergency exits



Assembly point



Rest rooms



Cloud Chamber Workshop

Outline

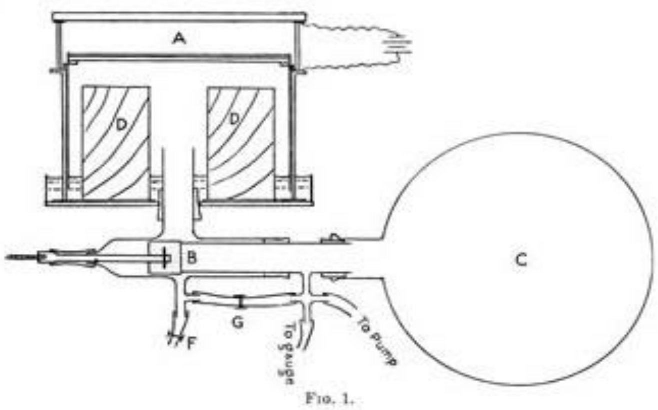
- History
- Step by step tutorial
- Build your own particle detector
- Tidying up
- Discussion and explanations

History

History

Charles T. R. Wilson (1869 - 1959)

This Scottish physicist perfected the first (expansion) cloud chamber in 1911 and received the Nobel Prize in 1927.

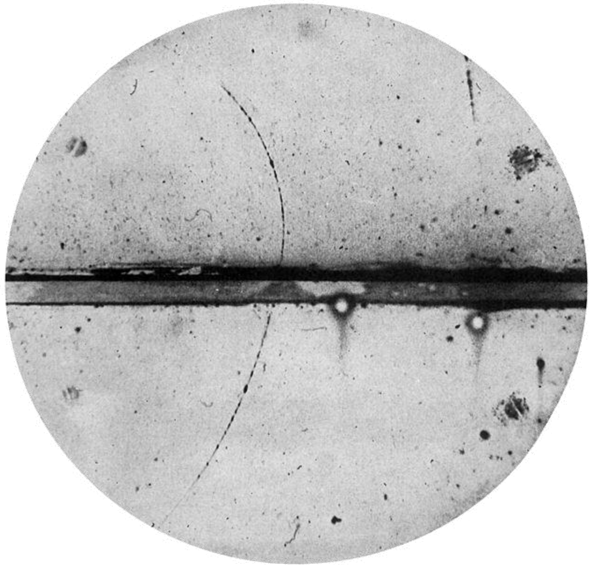


A diagram of Wilson's apparatus. The cylindrical cloud chamber ('A') is 16.5cm across by 3.4cm deep.

C. T. R. WILSON: On an Expansion Apparatus for Making Visible the Tracks of Ionising Particles in Gases and Some Results Obtained by Its Use. Proc. R. Soc. Lond. A. 1912 87 277-292 DOI:10.1098/rspa.1912.0081

Carl Anderson (1905 - 1991)

This physicist discovered the positron in 1932 and the muon in 1936 using a cloud chamber. He received the Nobel Prize in 1936.

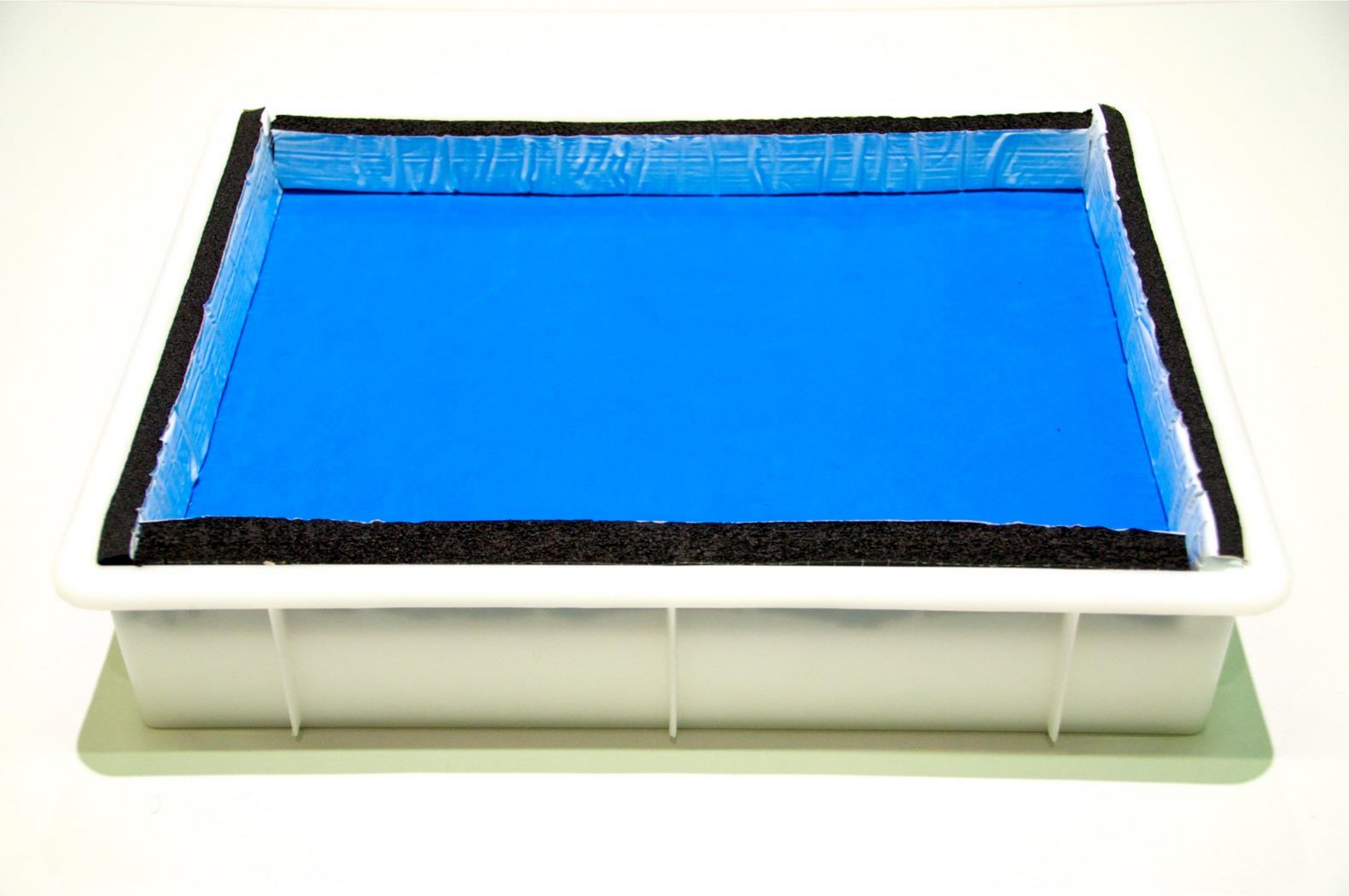


Carl D. Anderson (1905–1991) - Anderson, Carl D. (1933). "The Positive Electron". Physical Review 43 (6): 491–494. DOI:10.1103/PhysRev.43.491.

Step by step tutorial

Build your cloud chamber - step by step

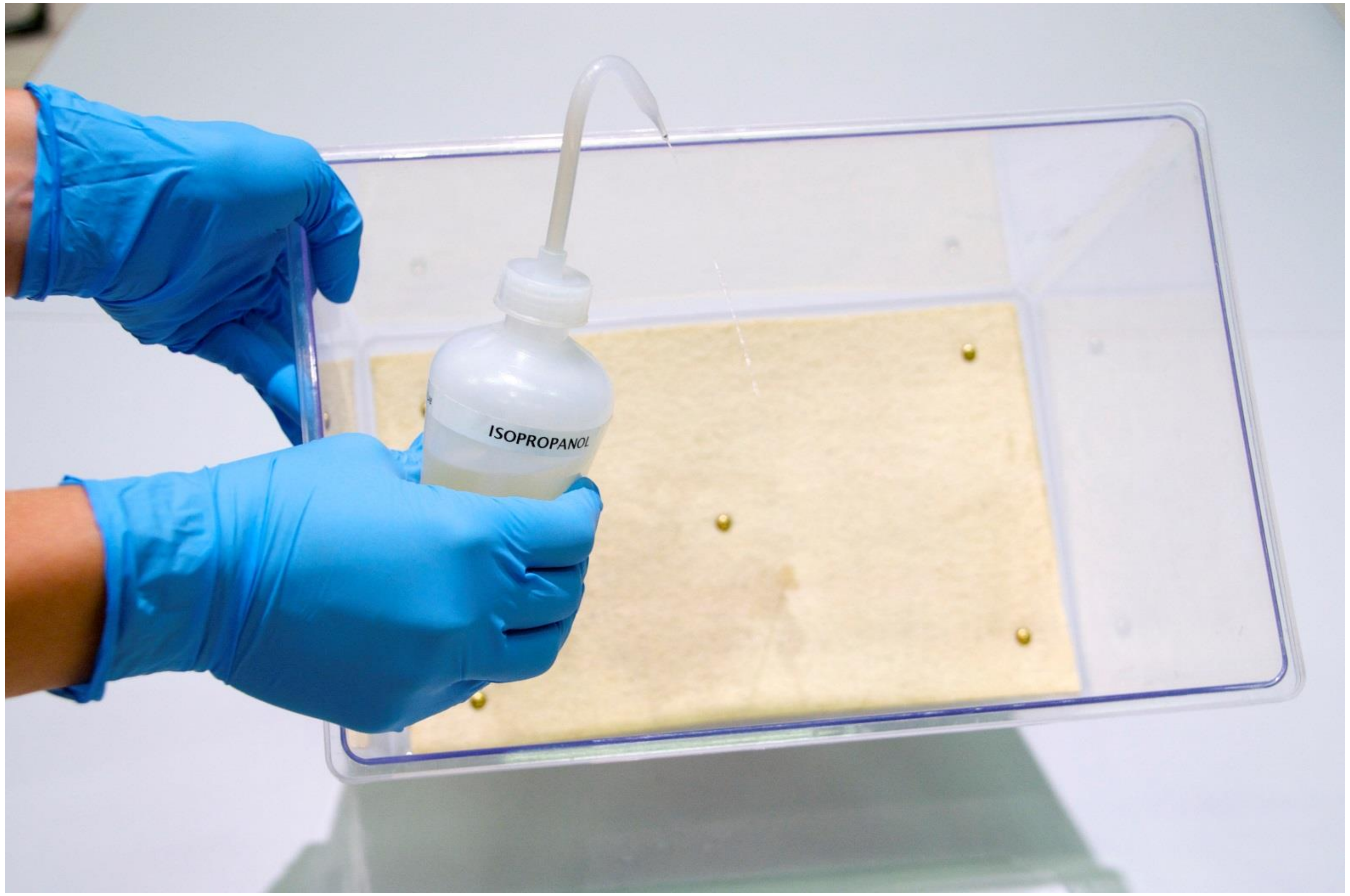
Build your cloud chamber - step by step



Build your cloud chamber - step by step

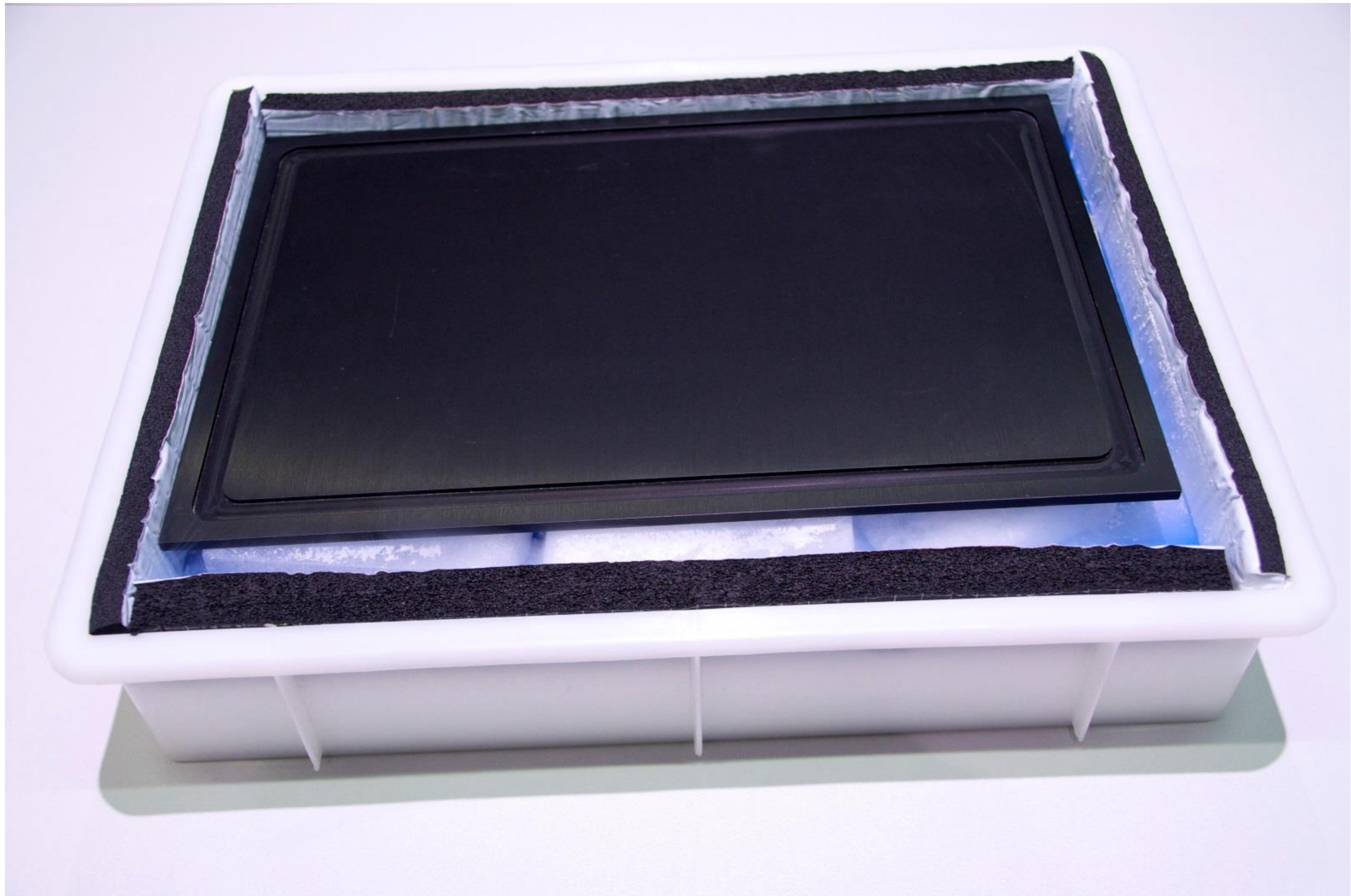
Build your cloud chamber - step by step

Build your cloud chamber - step by step

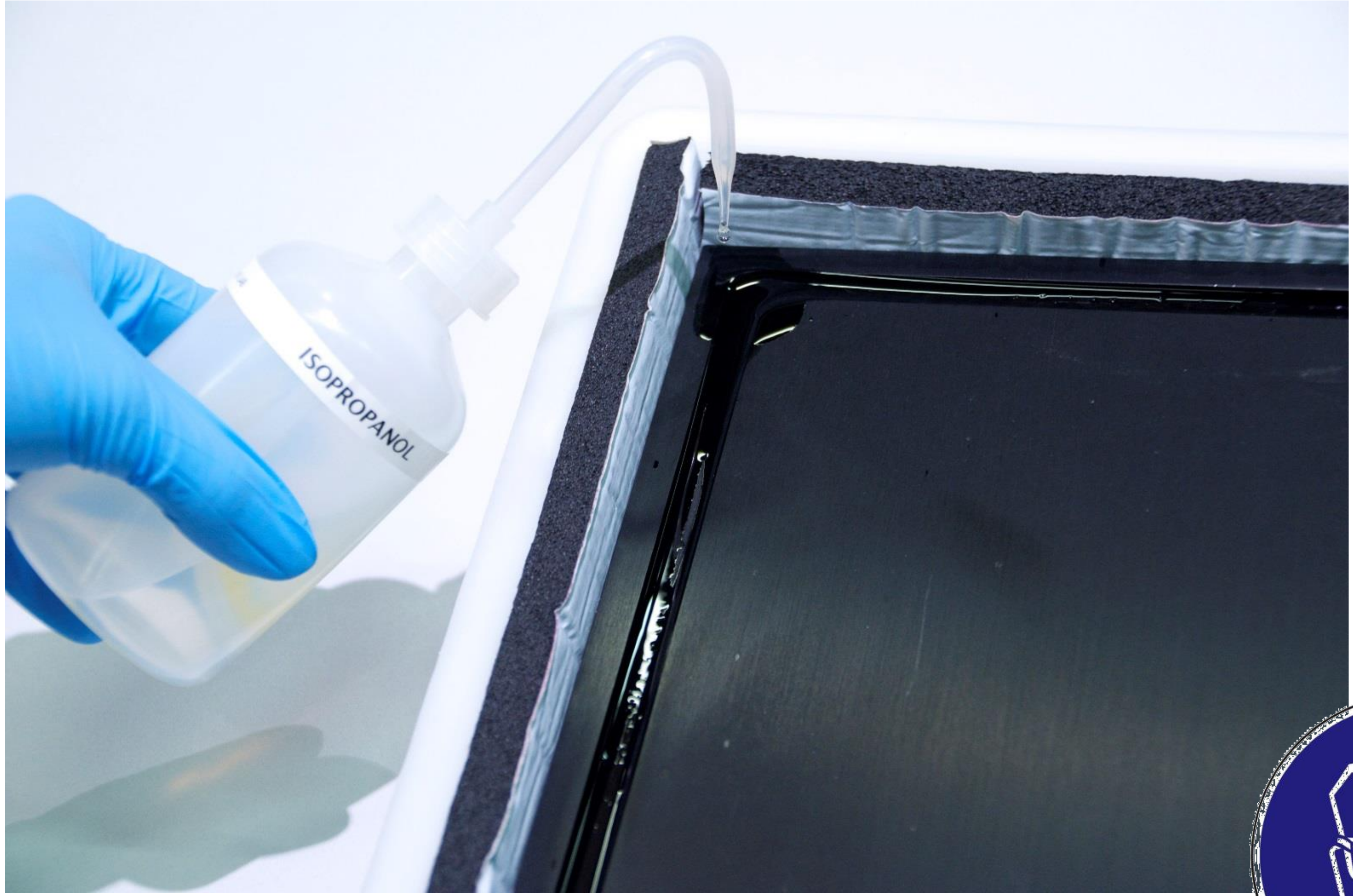


Build your cloud chamber - step by step

Build your cloud chamber - step by step



Build your cloud chamber - step by step



Build your cloud chamber - step by step

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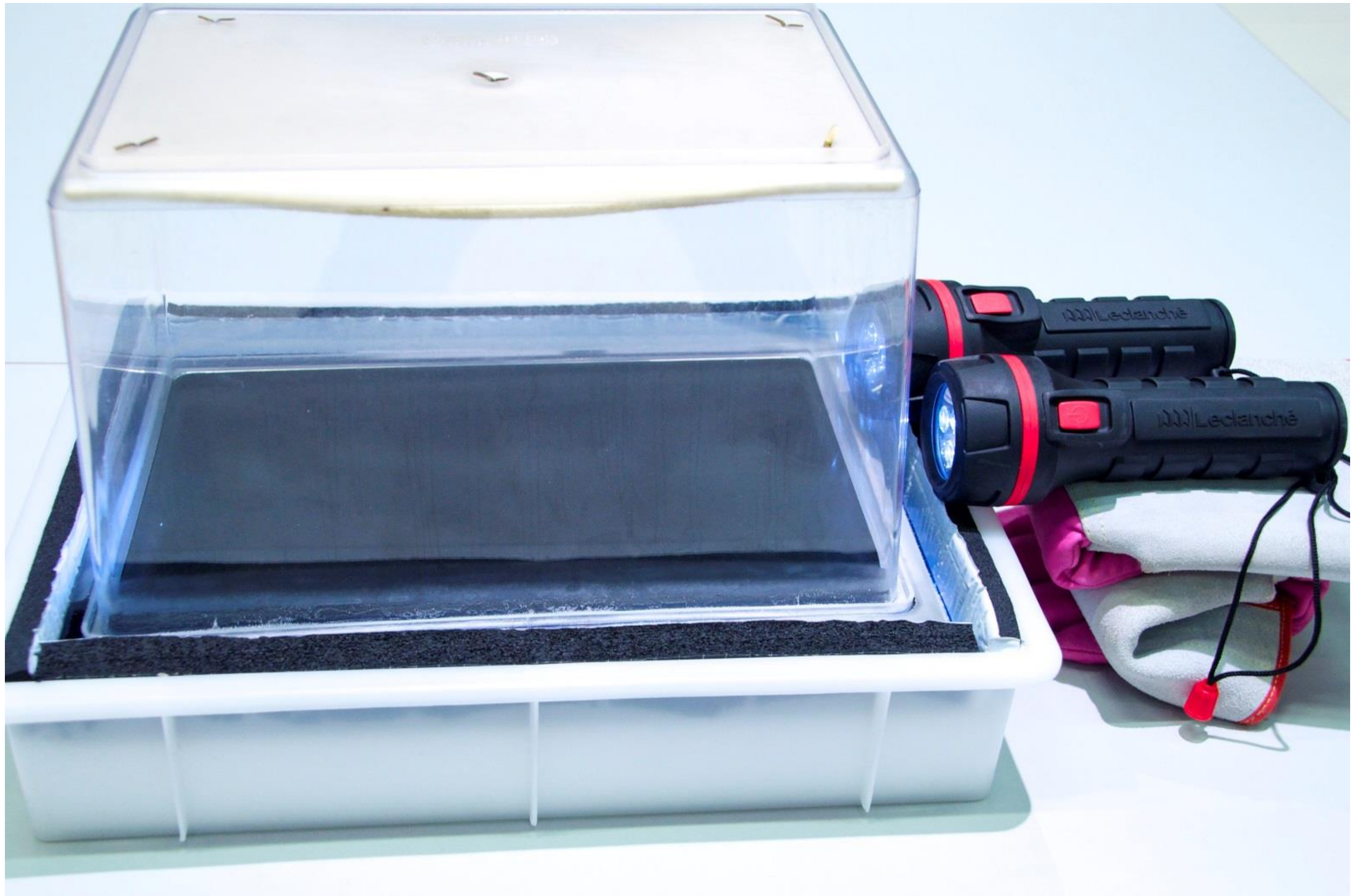
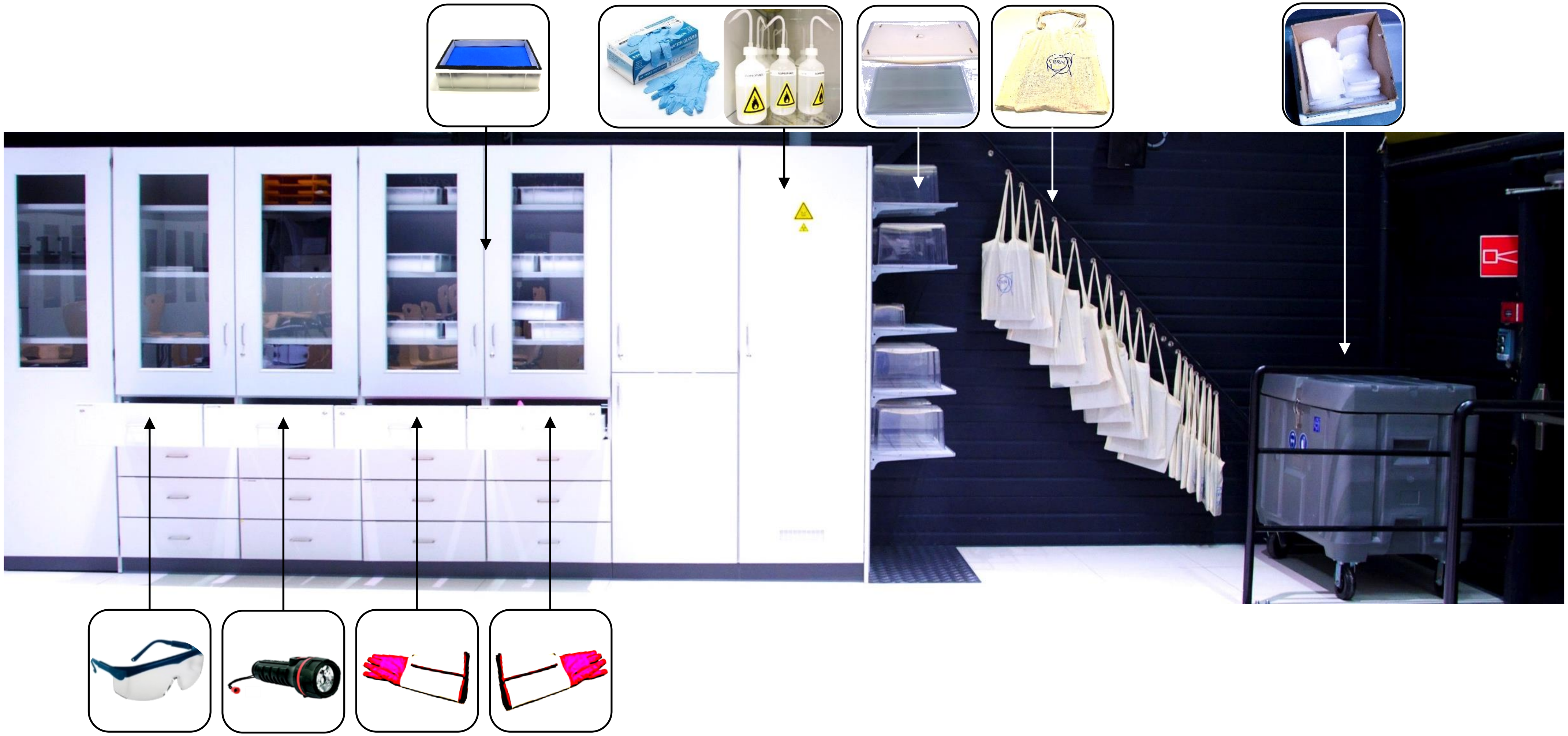


☞ Build your own particle detector!

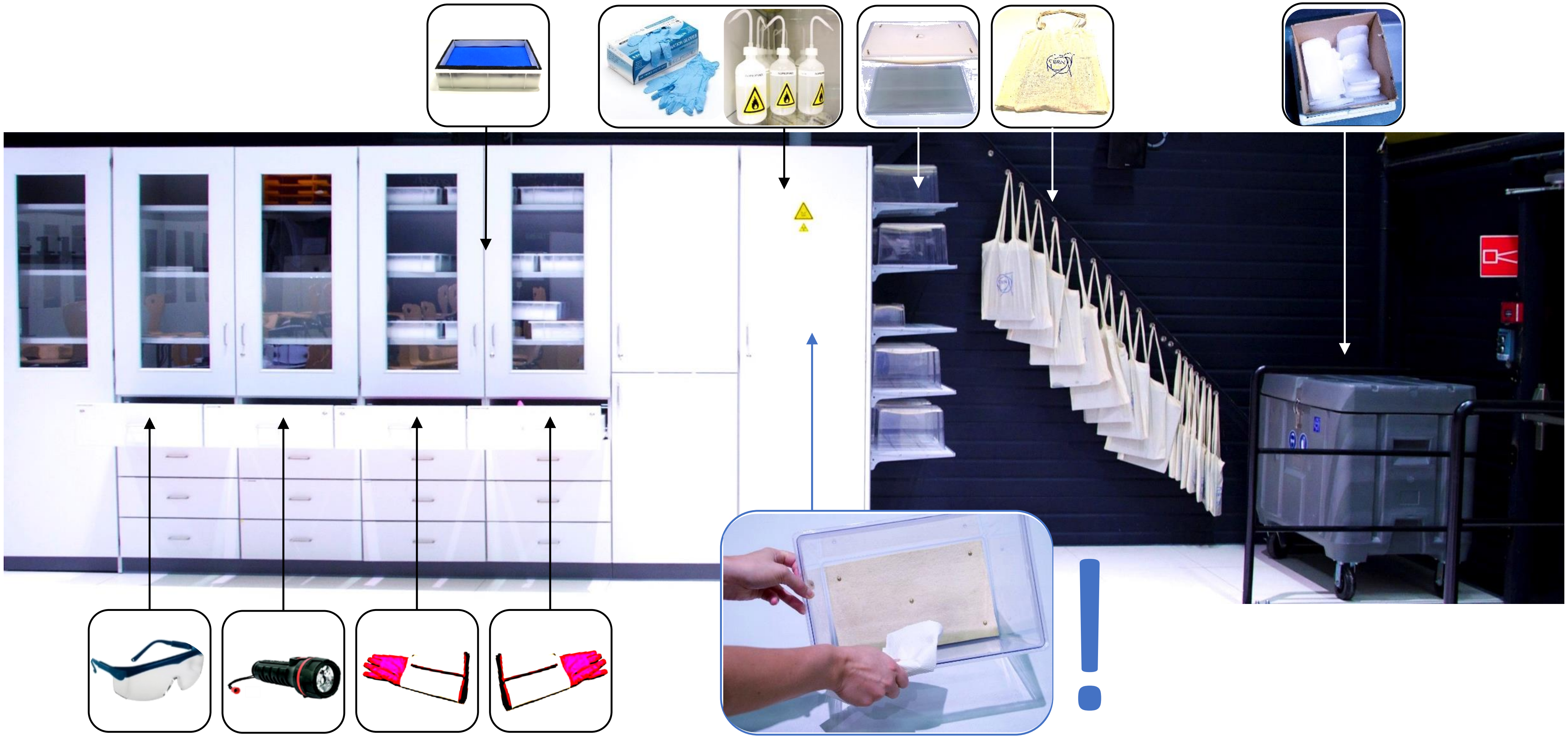


☞ Build your own particle detector!

Tasks

- Observe your Cloud Chamber
- Find the optimal torch position and the optimal observation position
- Describe visible tracks (shape, length, width, …)
- Discuss the reason for these tracks
- Count the number of tracks you can see for 1 minute, repeat this measurement 2 times

☞ Tidying up



Discussion and explanations

Whiteboard

Additional Material

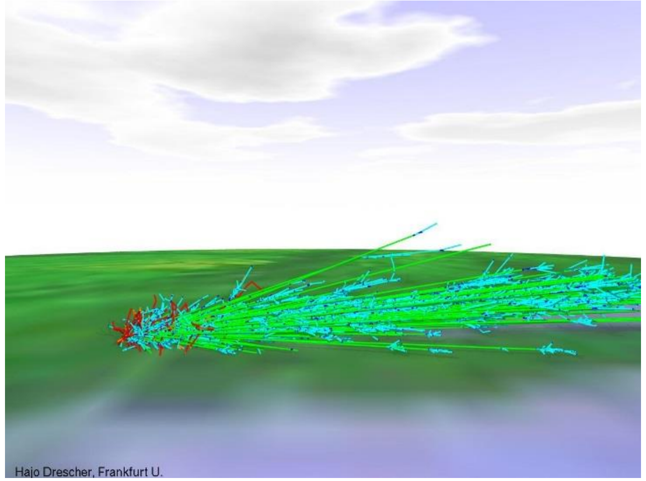
Air Shower Simulation

Cosmic Ray Air Shower Pictures

by H.-J. Drescher drescher@th.physik.uni-frankfurt.de.

Air showers are cascades of secondary particles induced in the atmosphere by high energy cosmic rays. What you see here is a **visualisation of realistic simulations of these showers**. Of course, not all of the particles in a shower are displayed, there are far too many! The **fraction displayed here is about 1e-6**, sampled with a **thinning algorithm**.

blue:electrons/positrons
cyan:photons
red:neutrons
orange: protons
gray: mesons
green:muons



http://th.physik.uni-frankfurt.de/~drescher/CASSIM/

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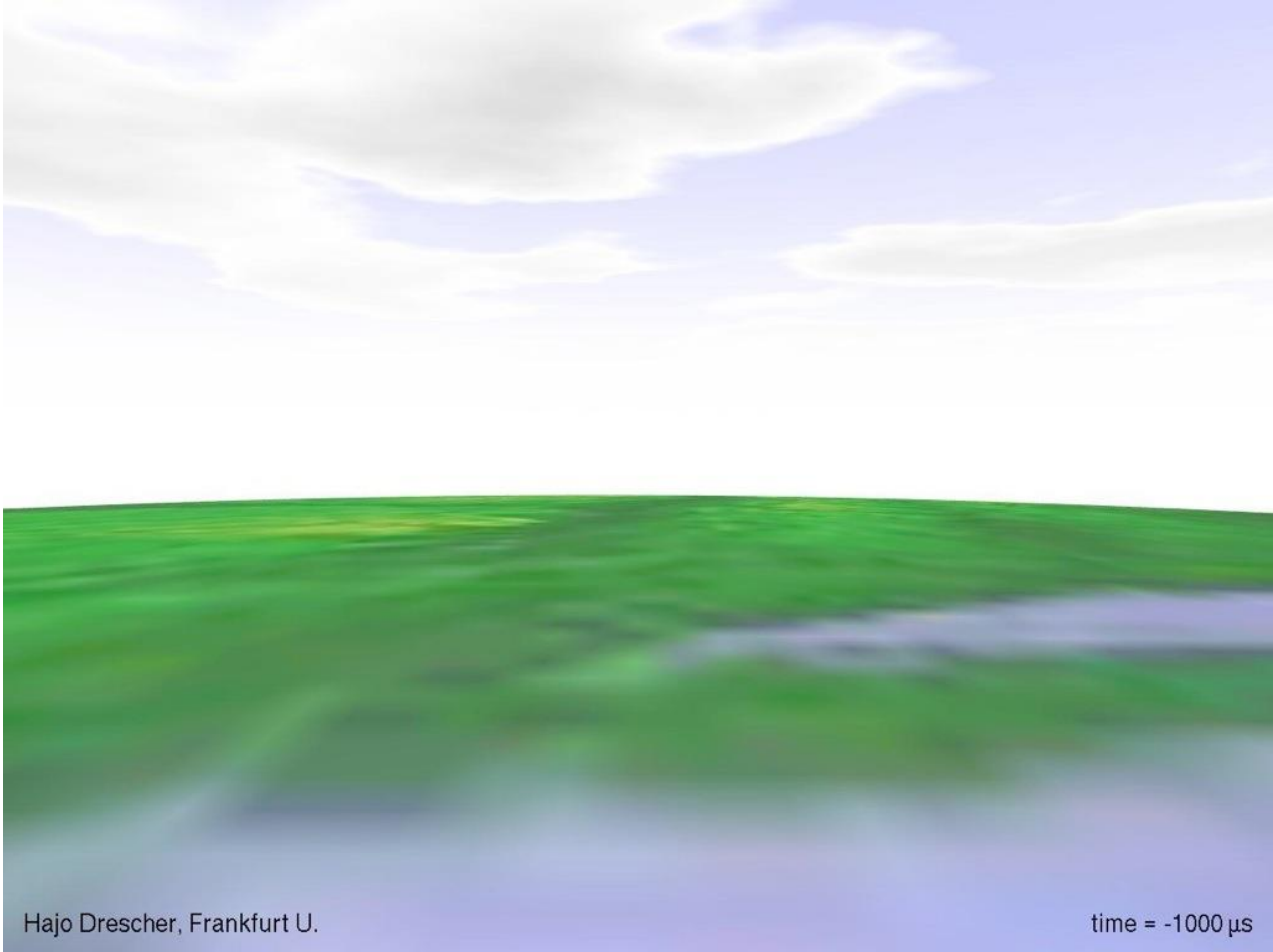

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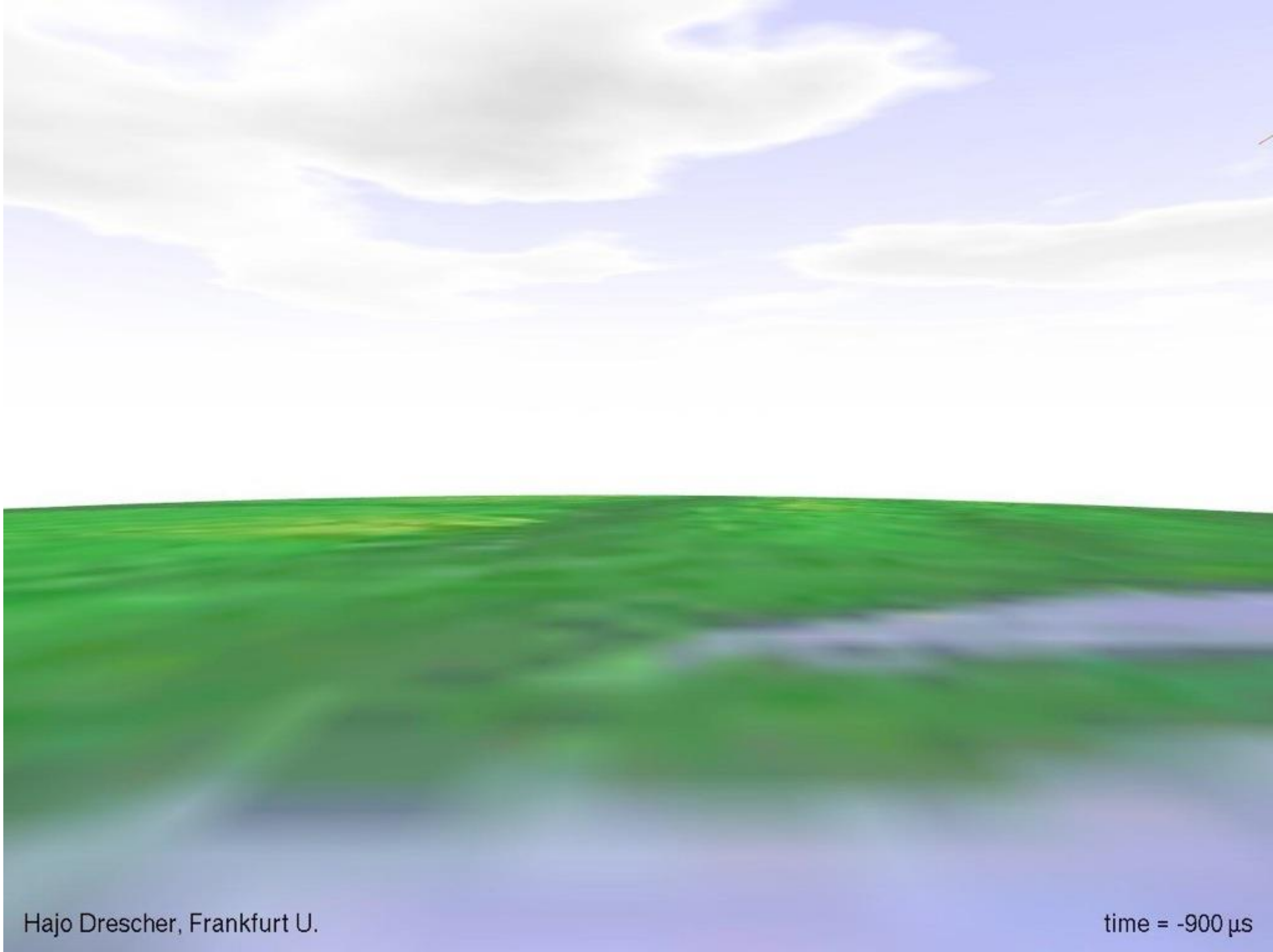

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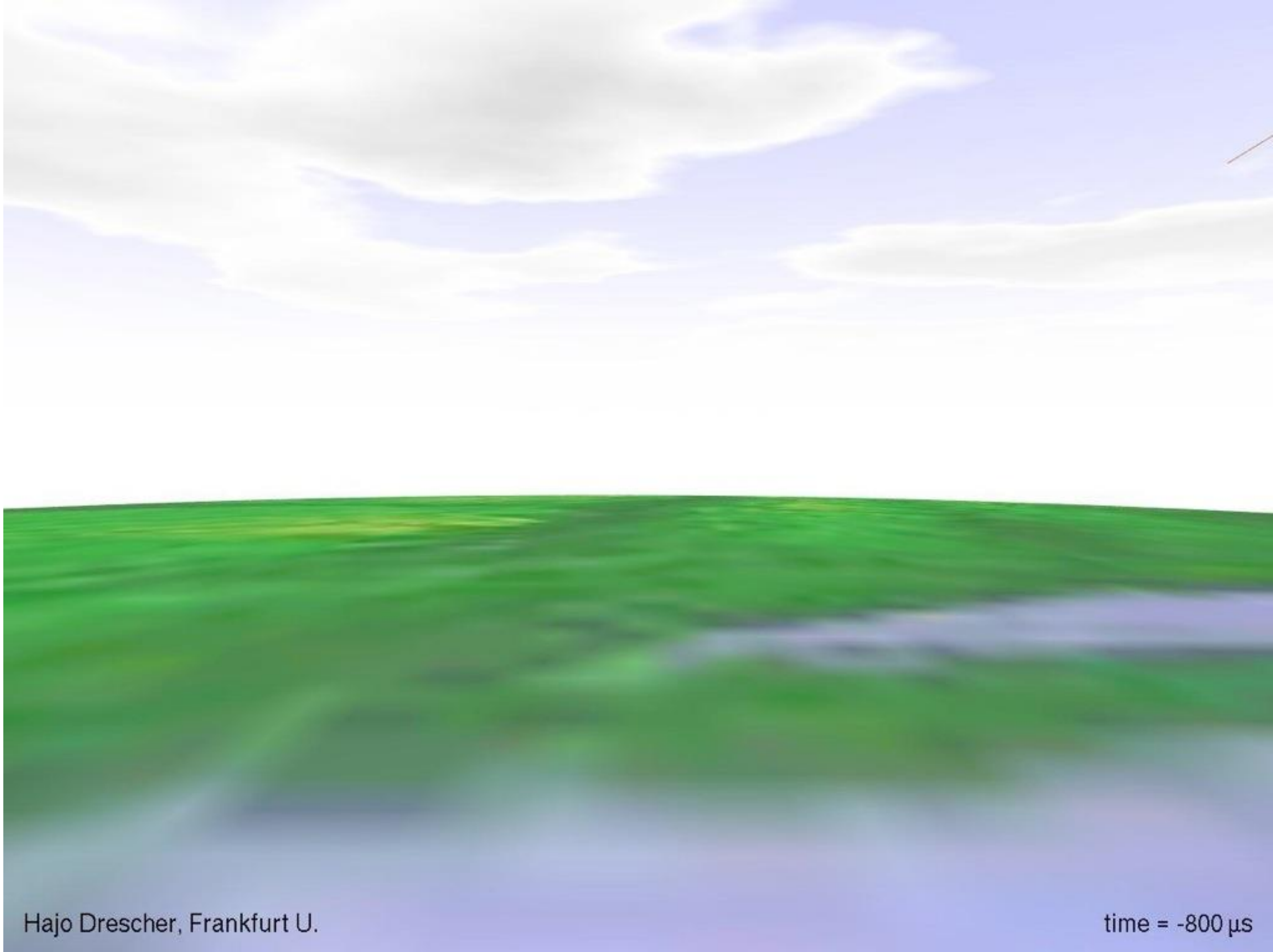

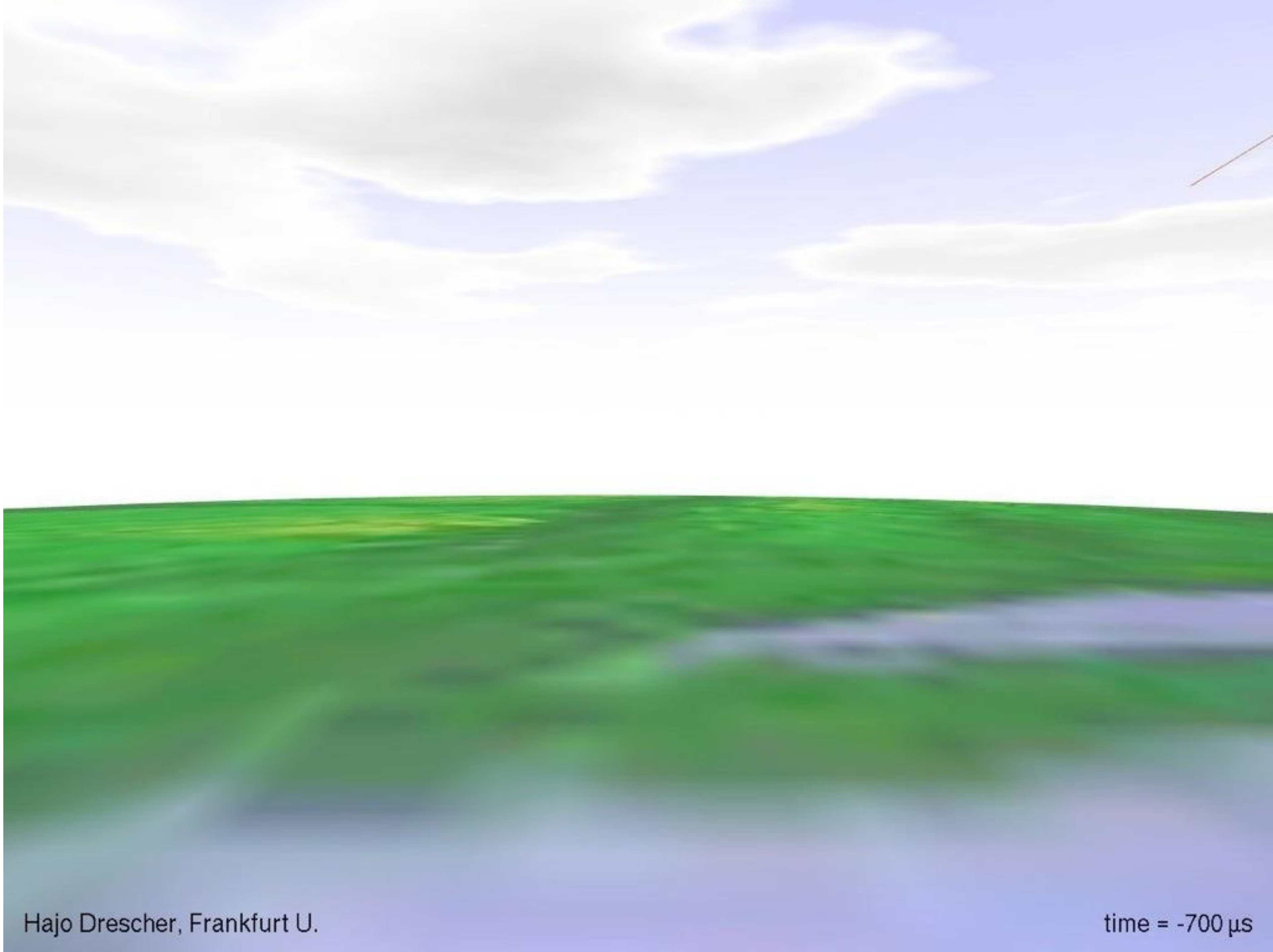

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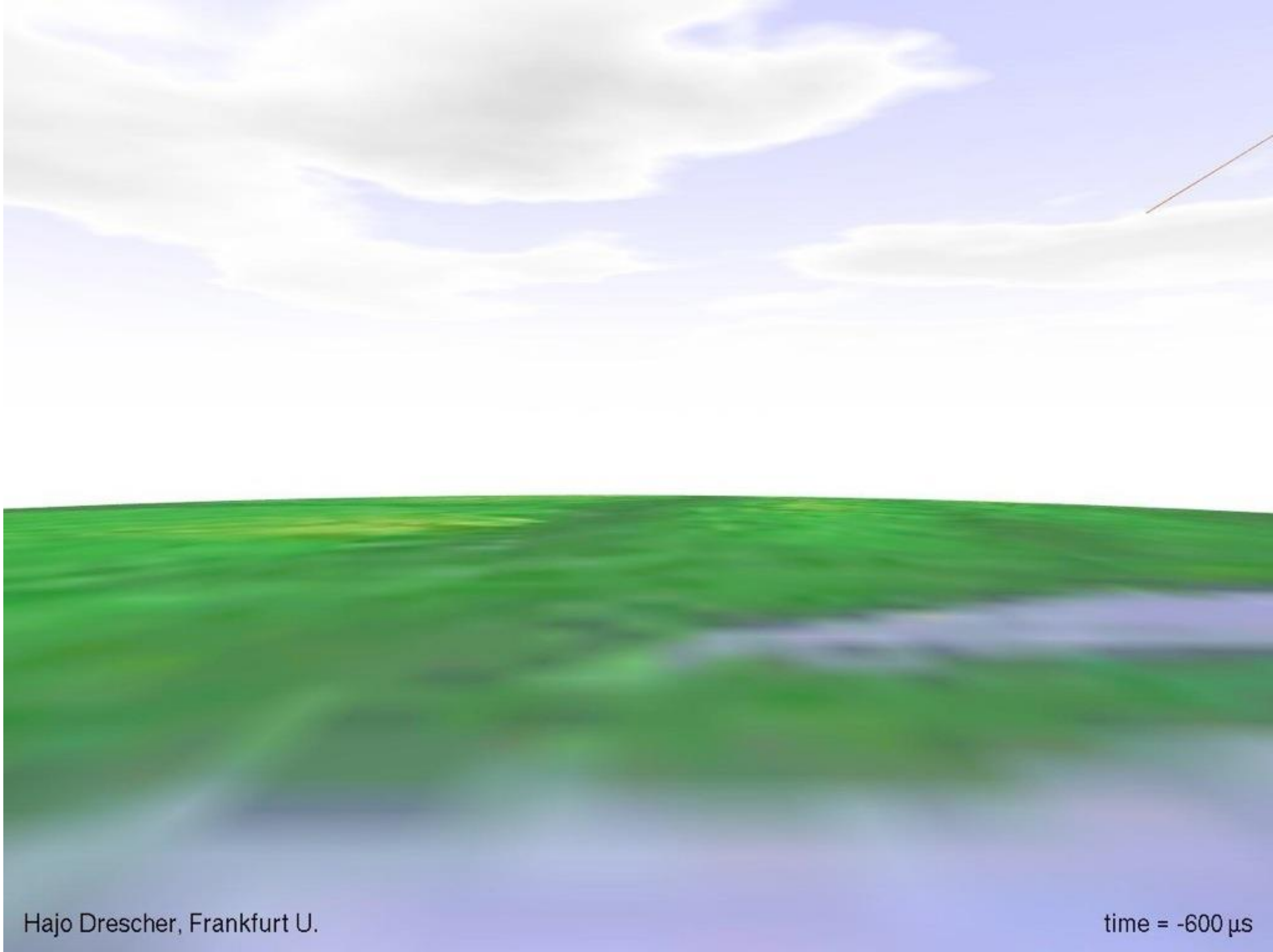

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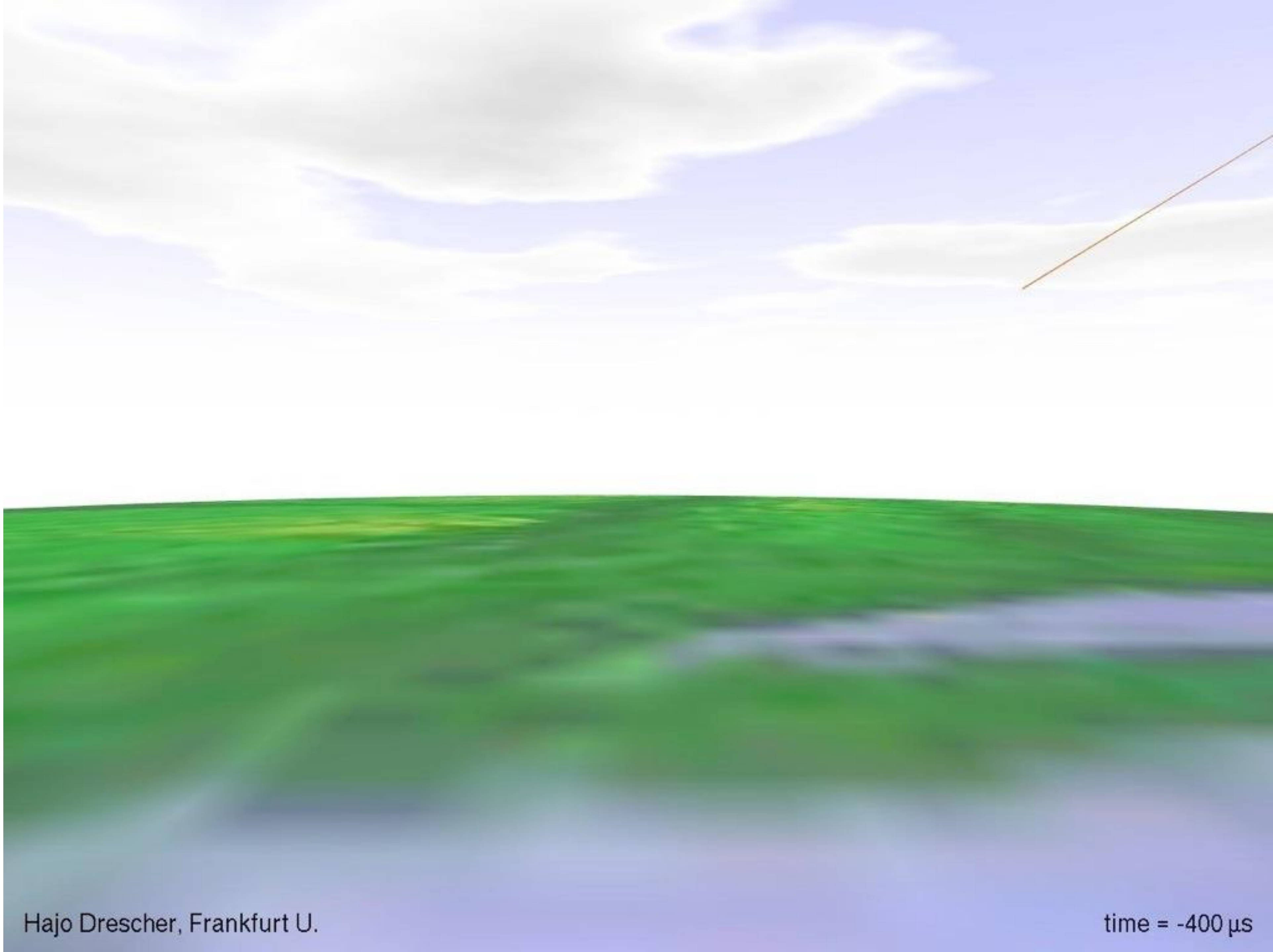

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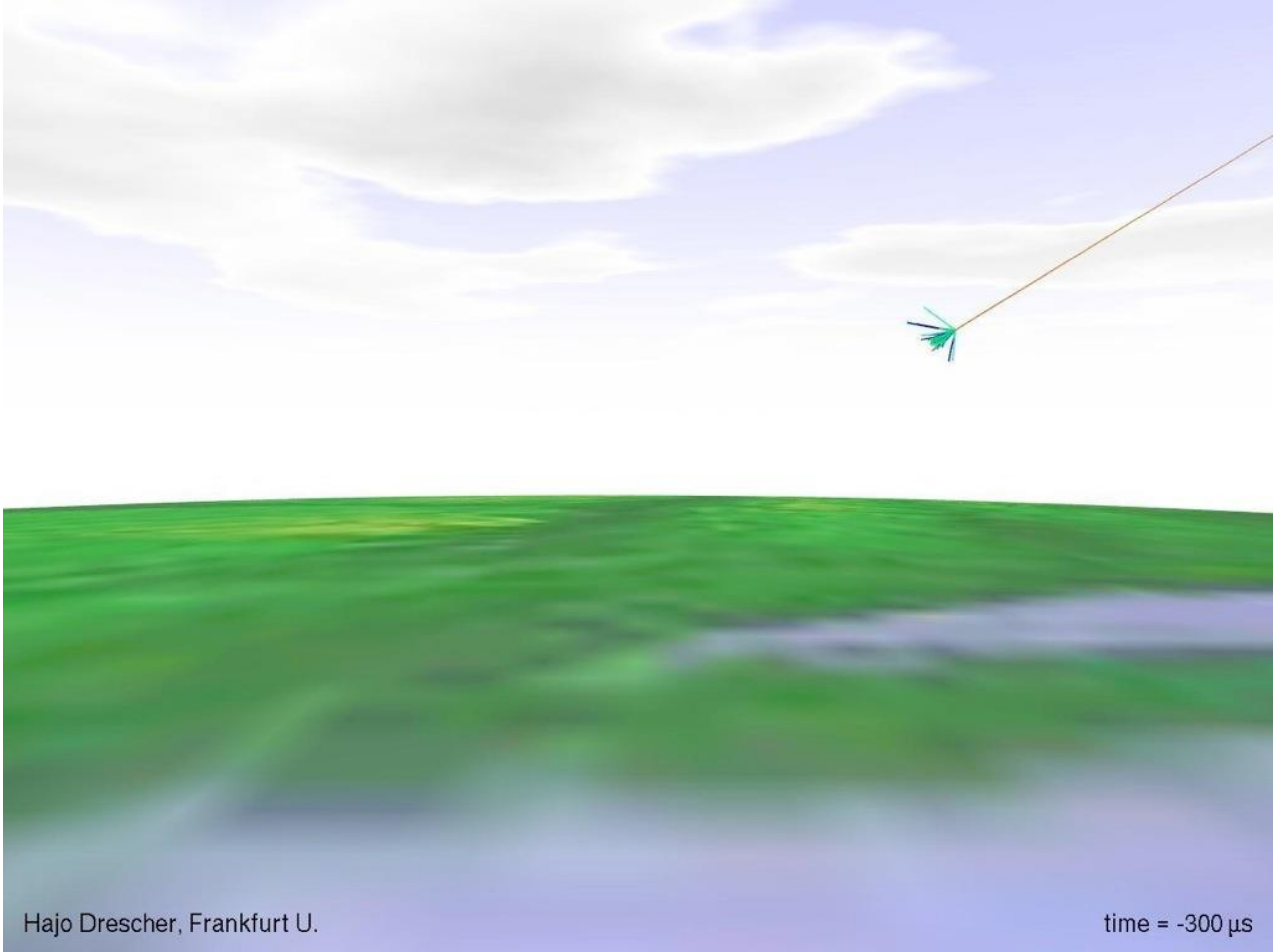

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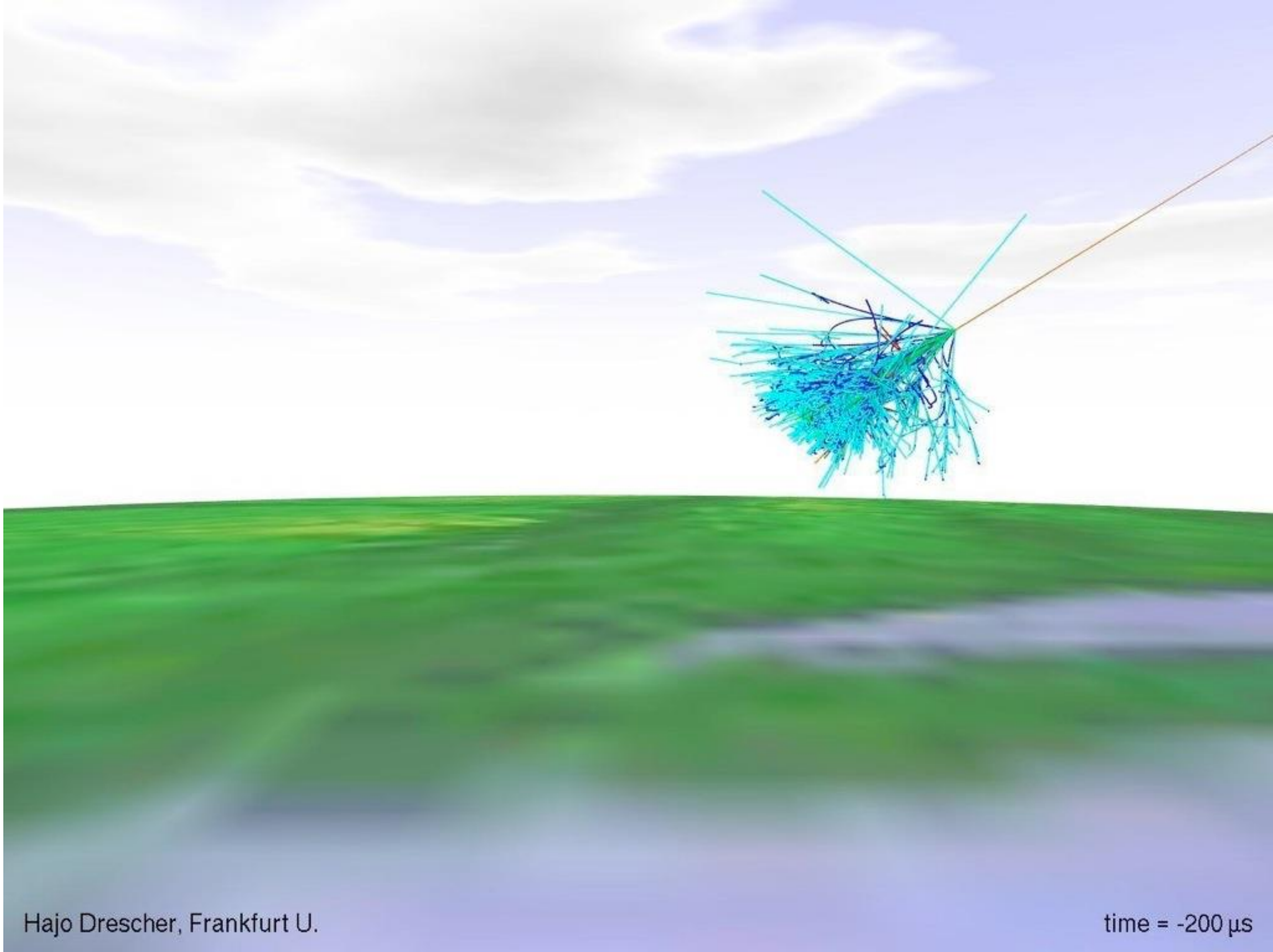

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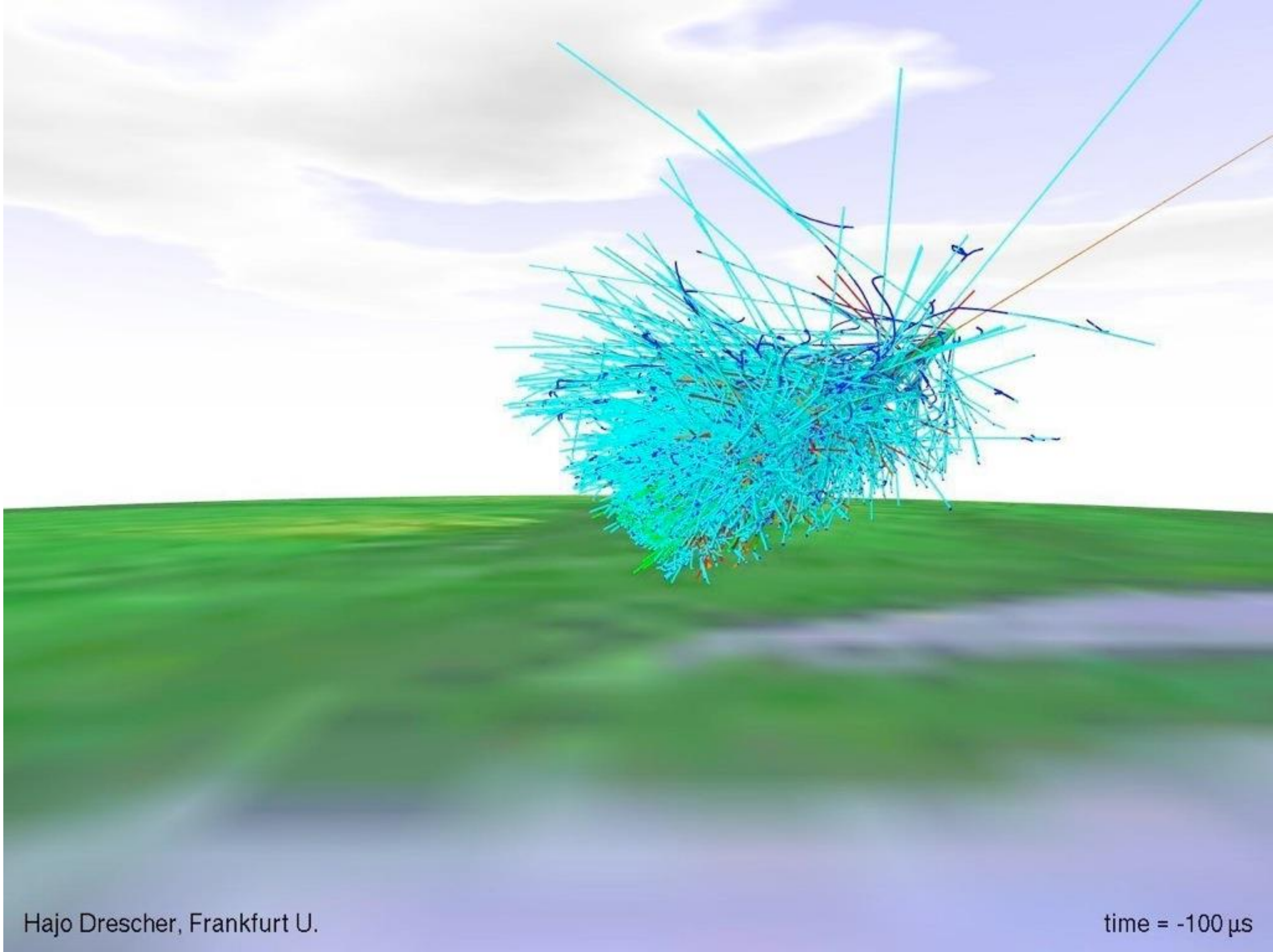

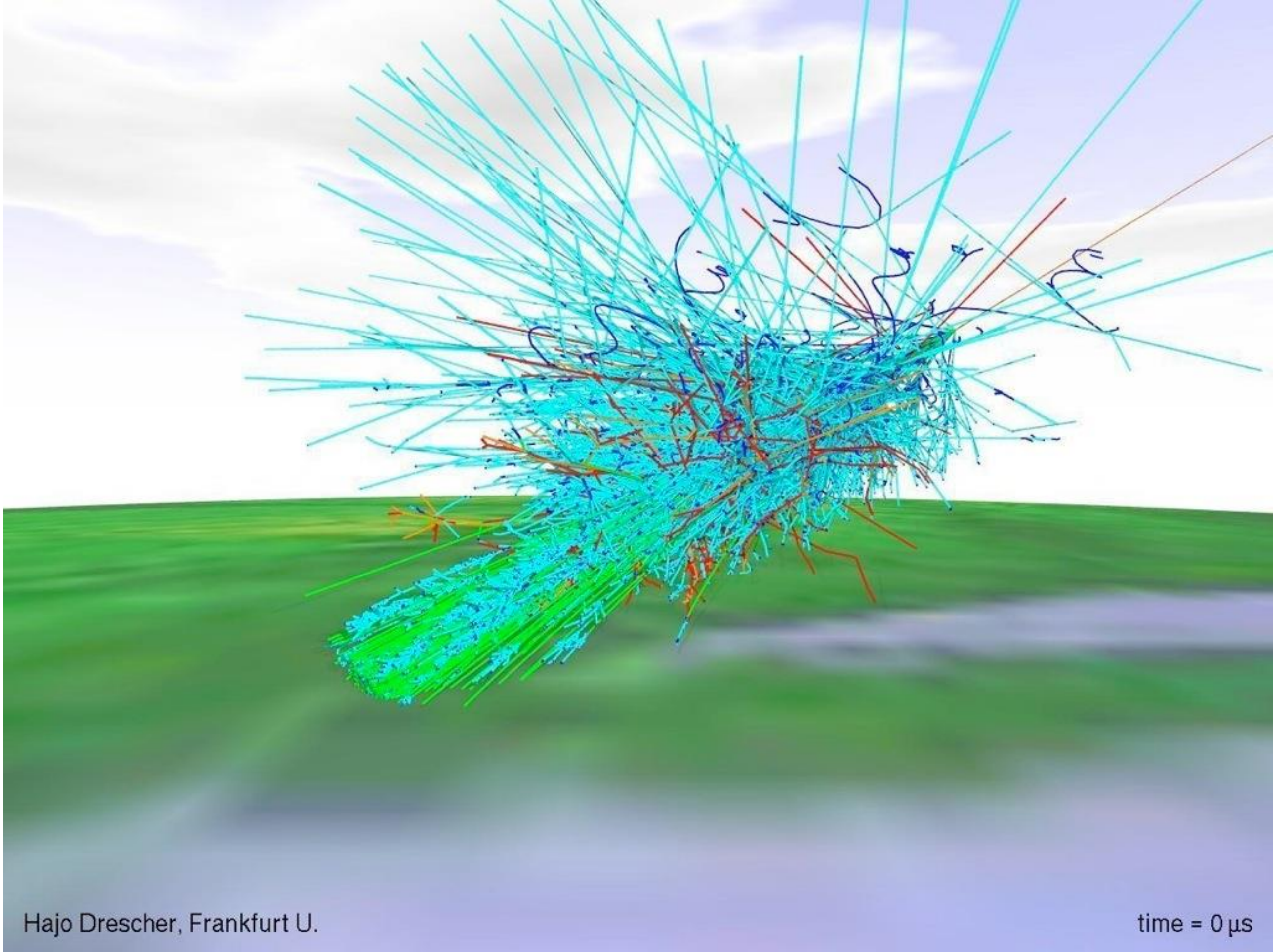

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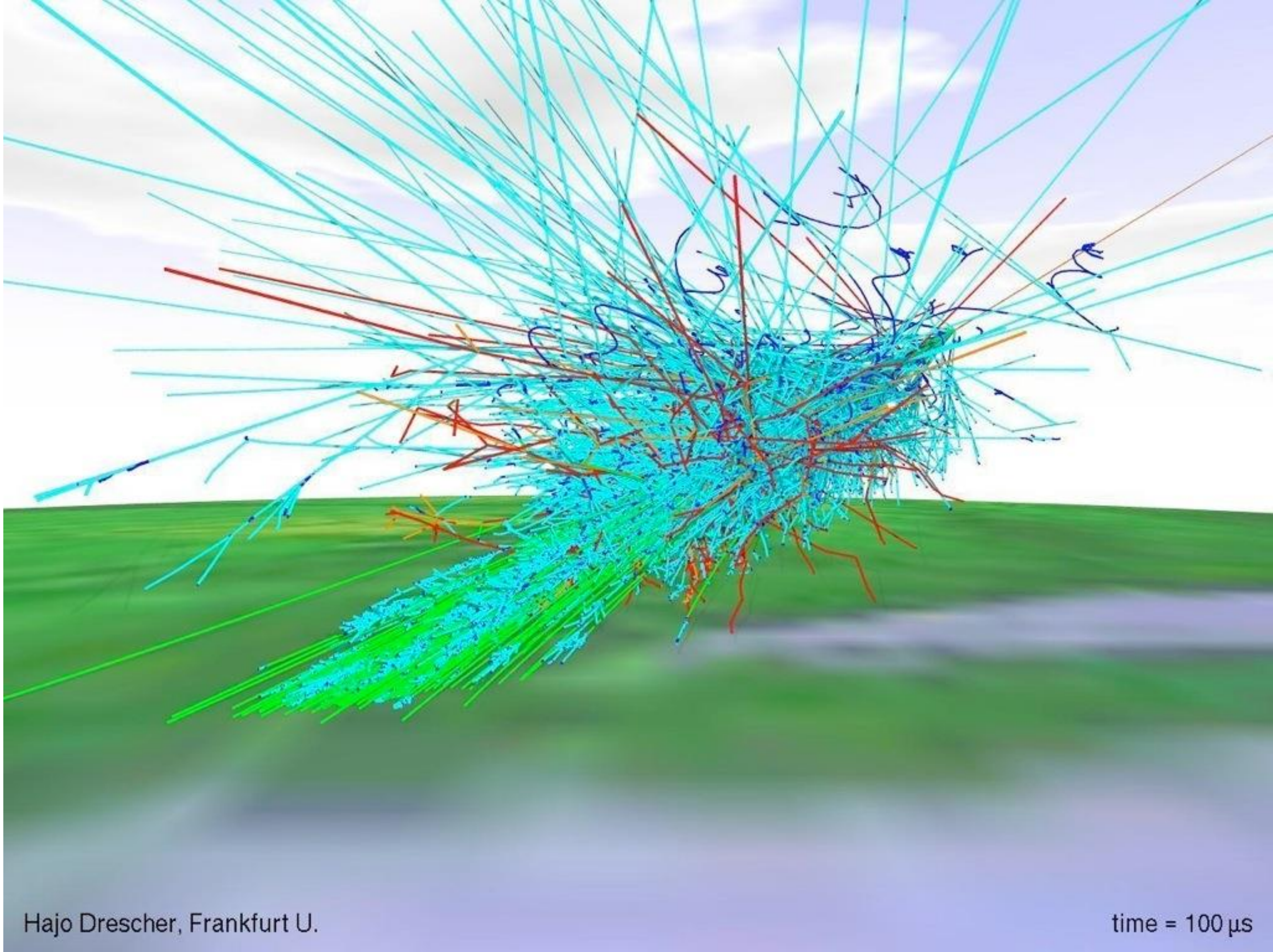

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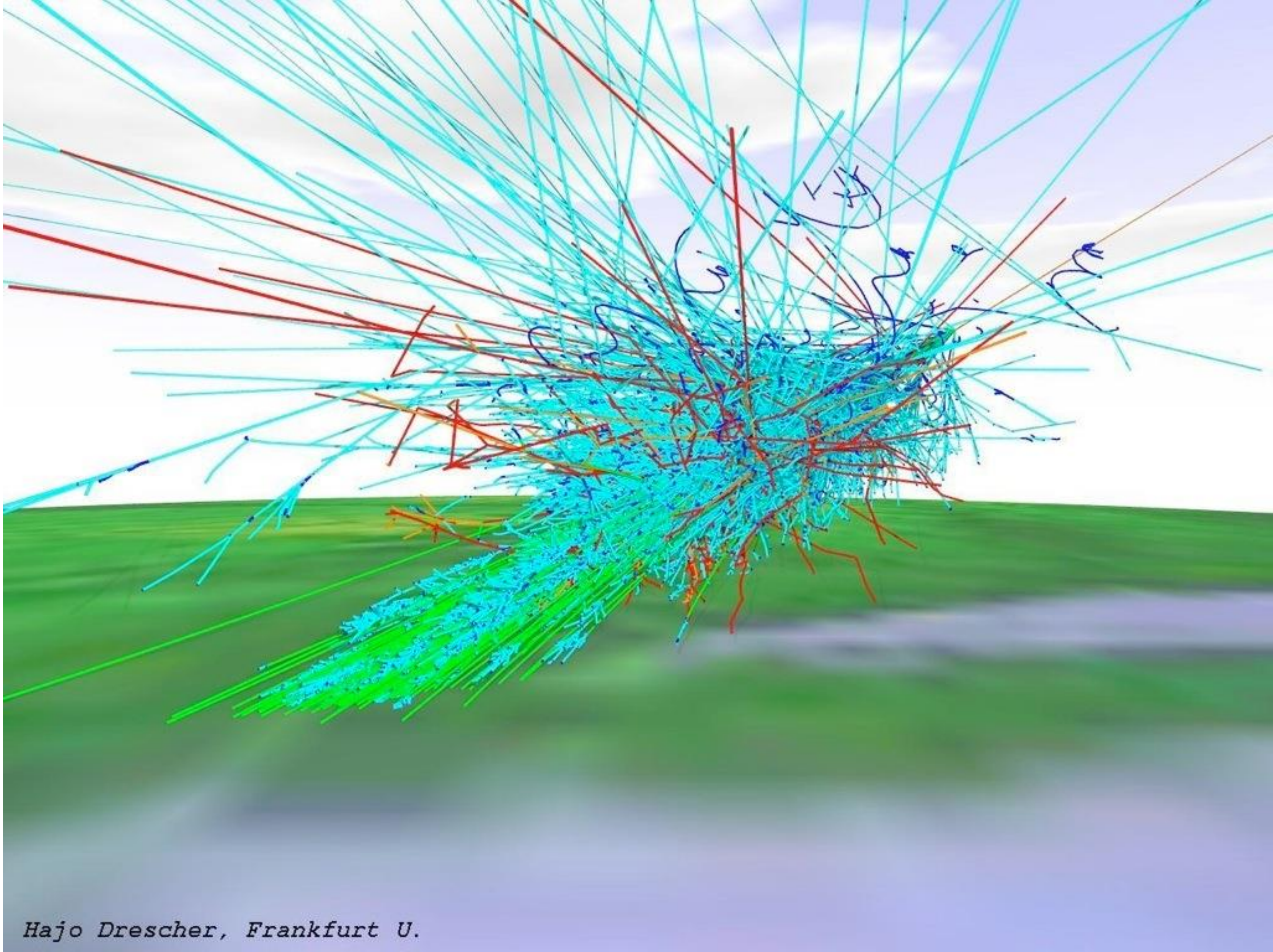

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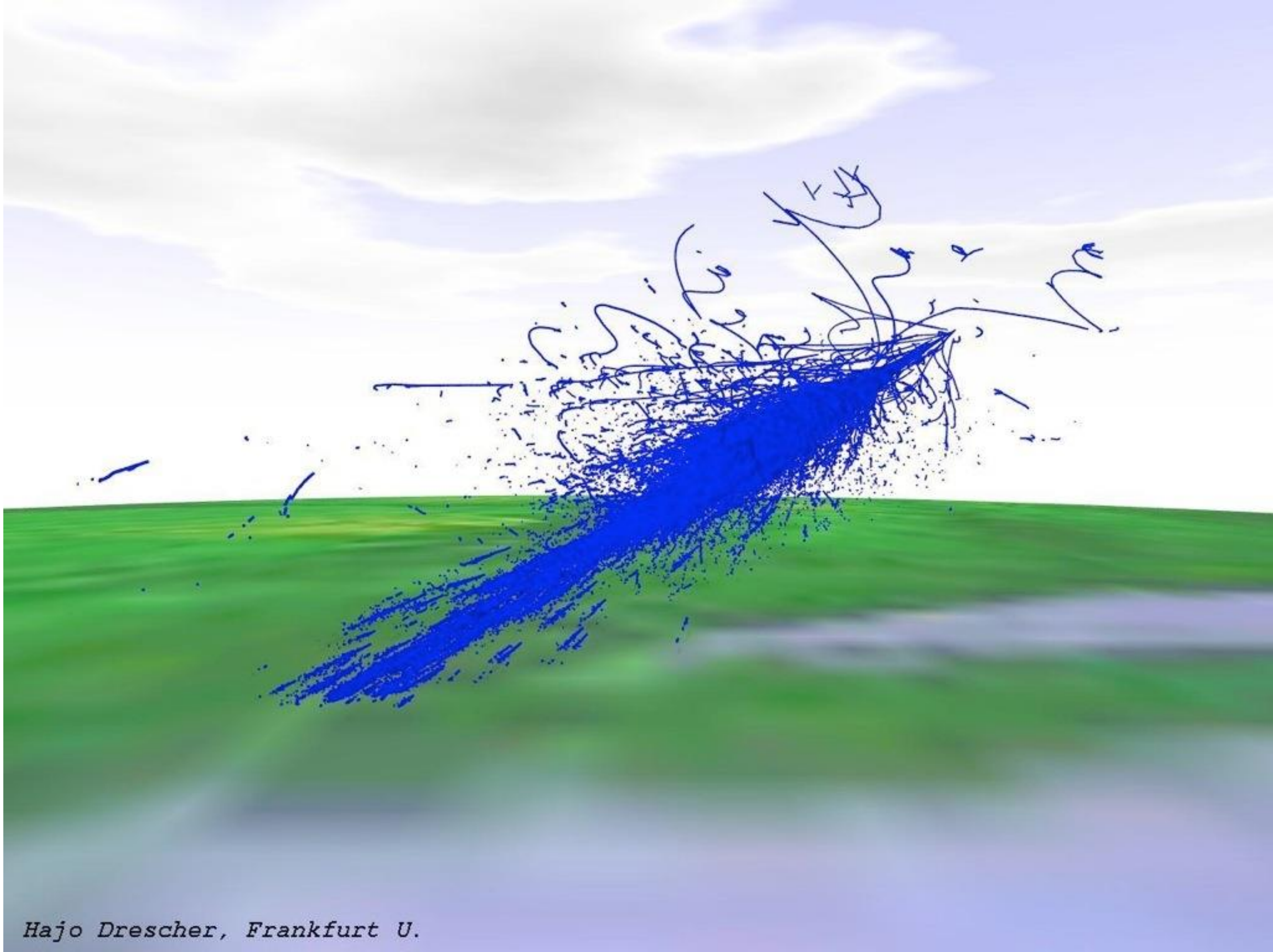

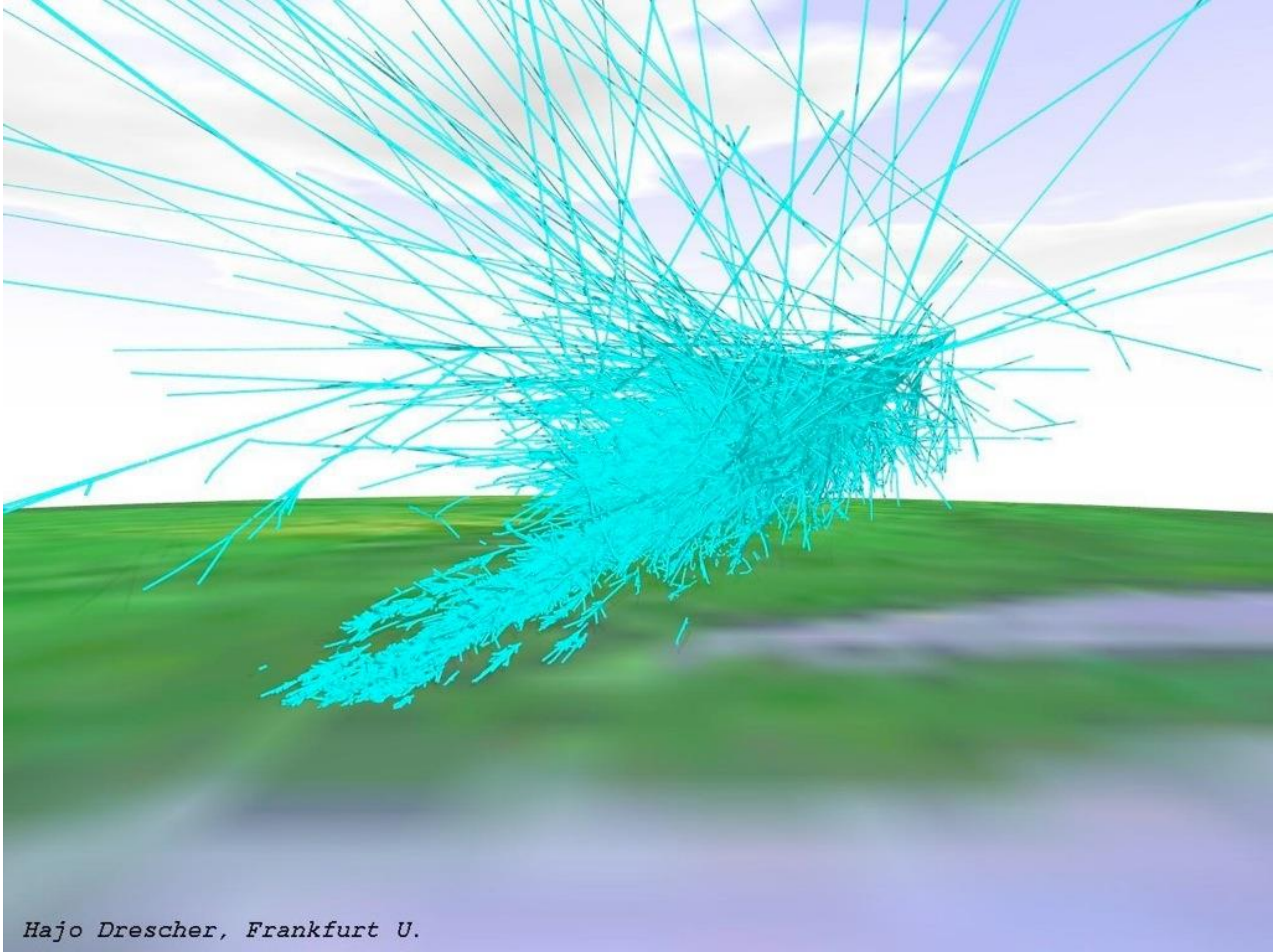

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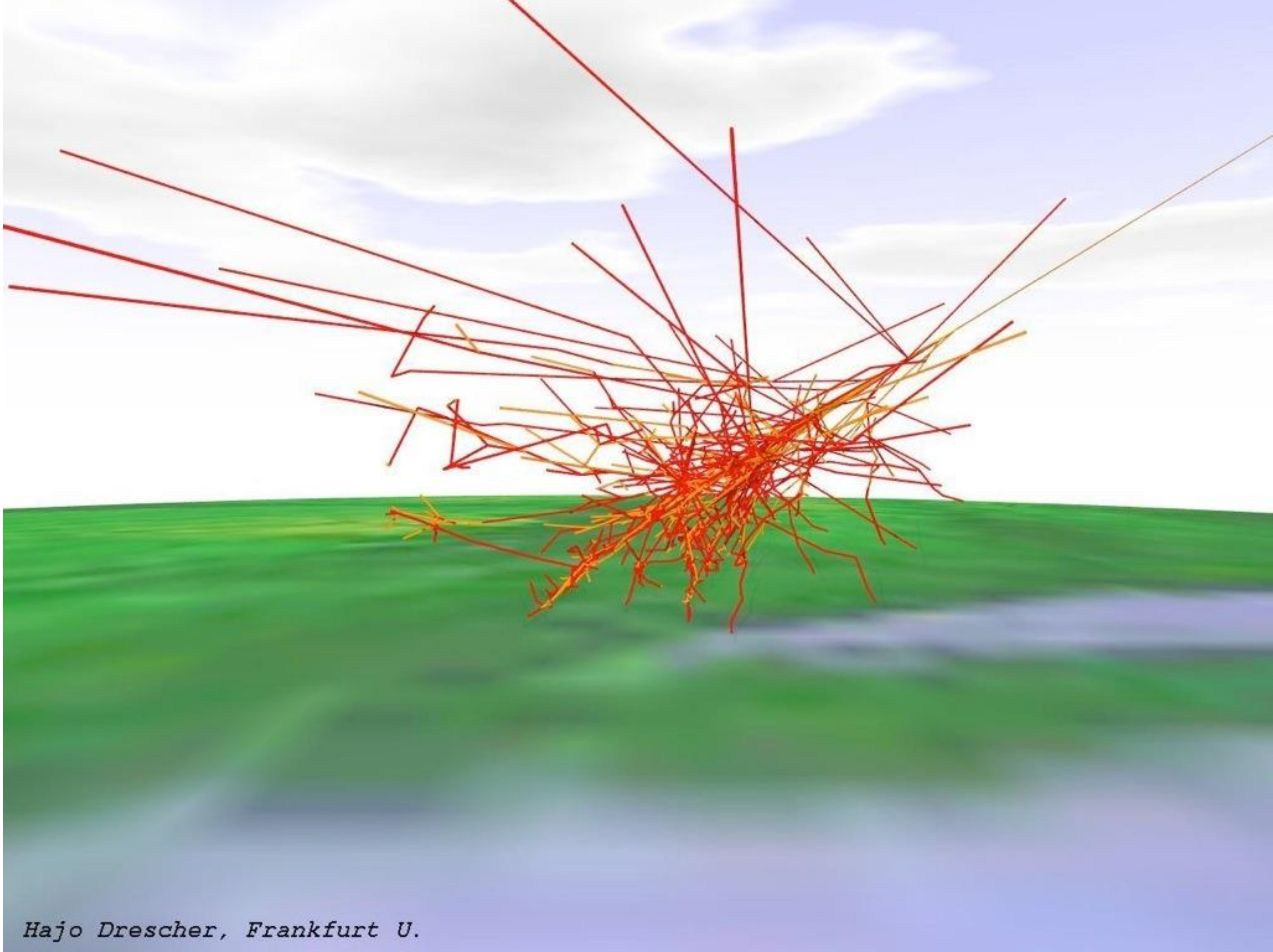

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