

Expanding the Universe in the Classroom: Visualizing Key Cosmological Principles



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Abstract: Expanding the Universe in the Classroom

is a DVD-based professional development experience for teachers sponsored by **NASA UniverseForum**.

Goal: to increase and improve the teaching of cosmology in grades 8–12 by providing resources and enhancing teacher content knowledge.

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Teacher Survey: approximately 600 responses from 24 states

Demographics of the study:

Public school: 88%

Private school: 12%

Earth science: 45%

Physics: 27%

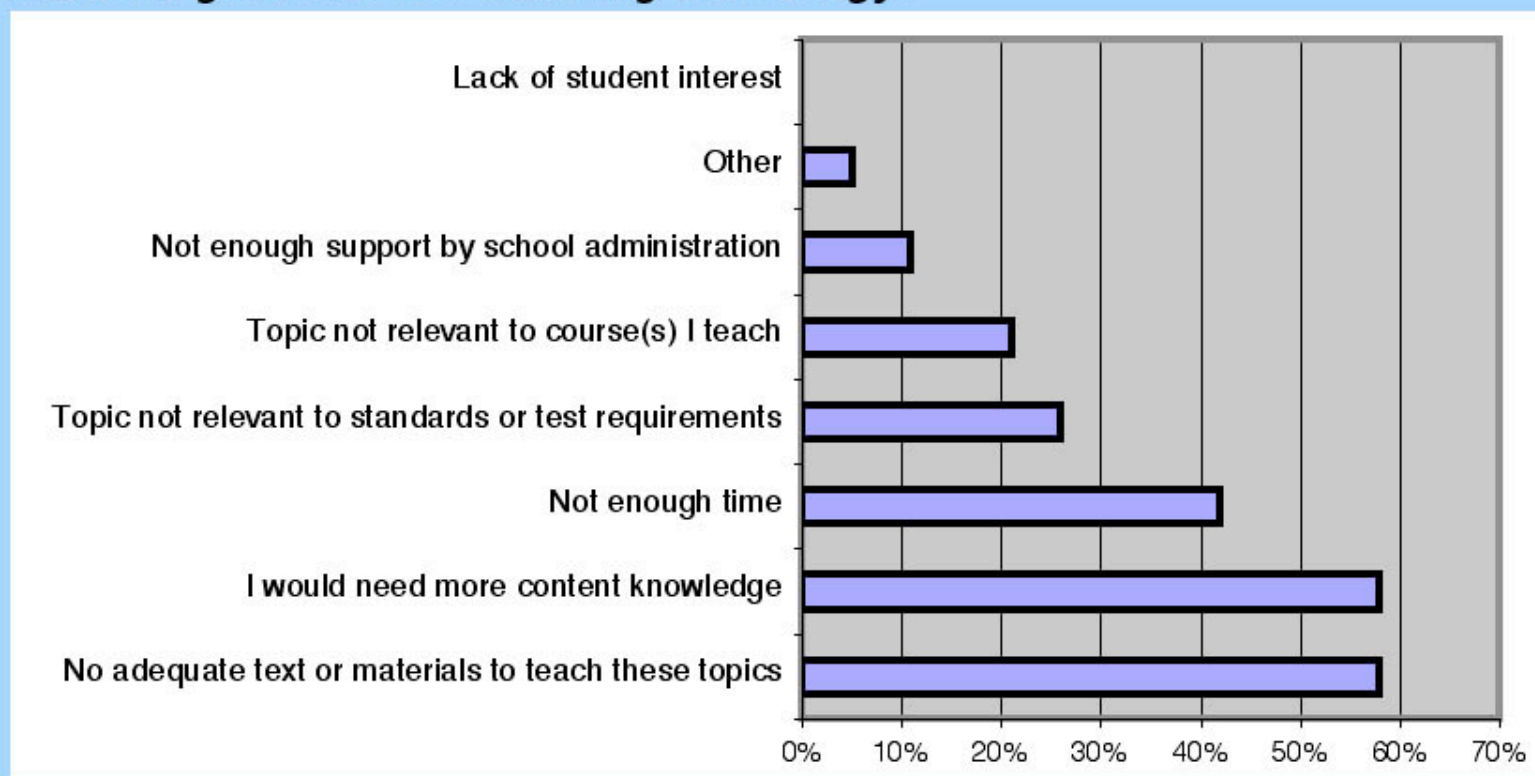
Astronomy: 32%

Other: 40%

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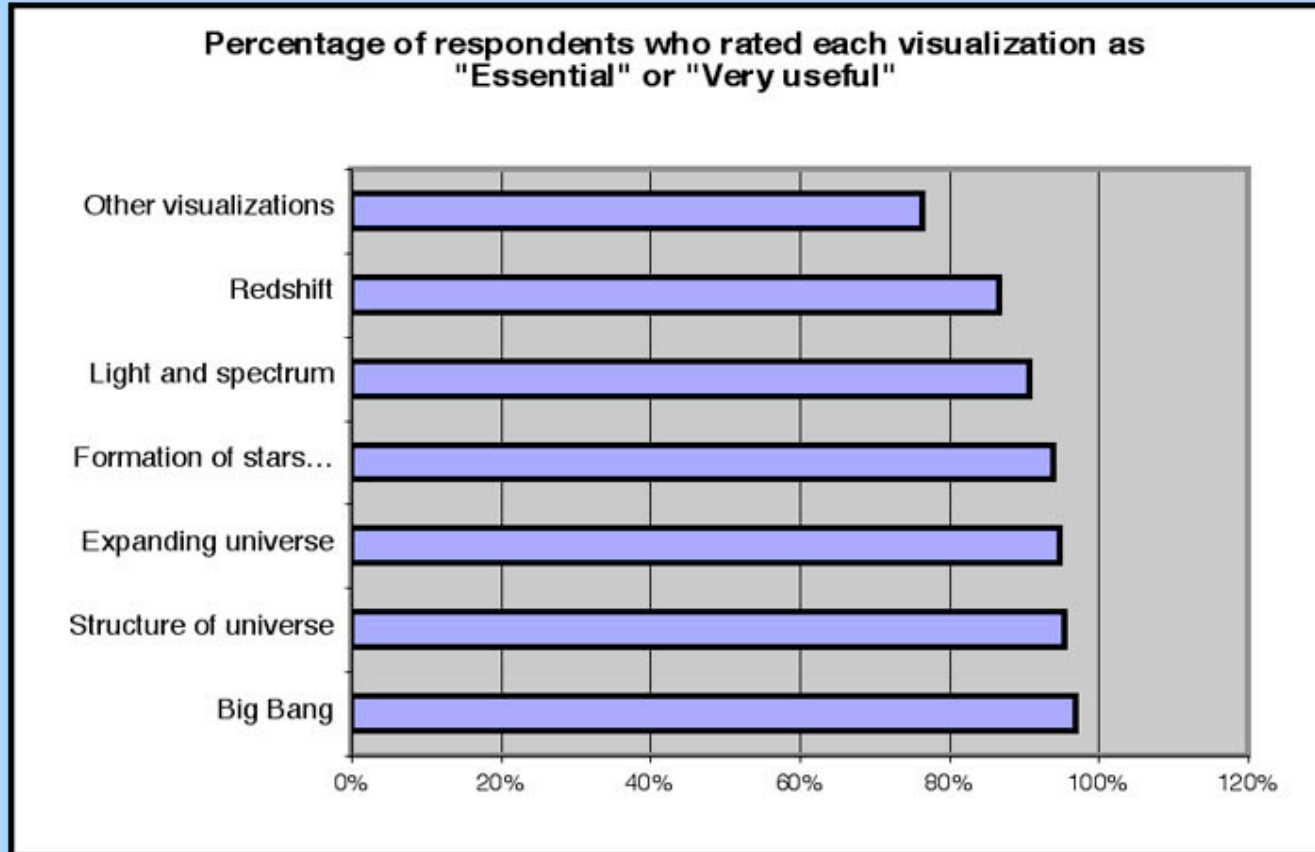
87% of the teachers surveyed include cosmology as part of their curriculum.

Reasons given for not teaching cosmology:



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Many teachers in the survey used visualizations to help them teach cosmology.



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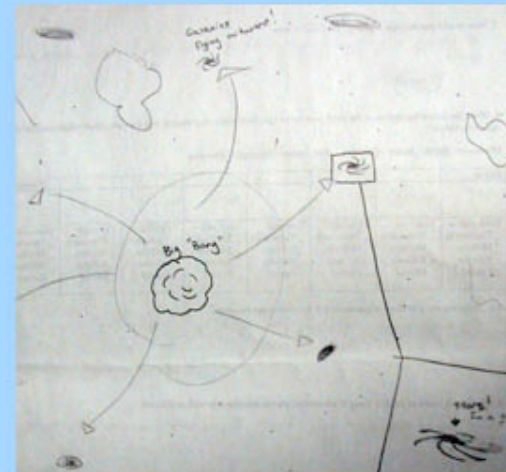
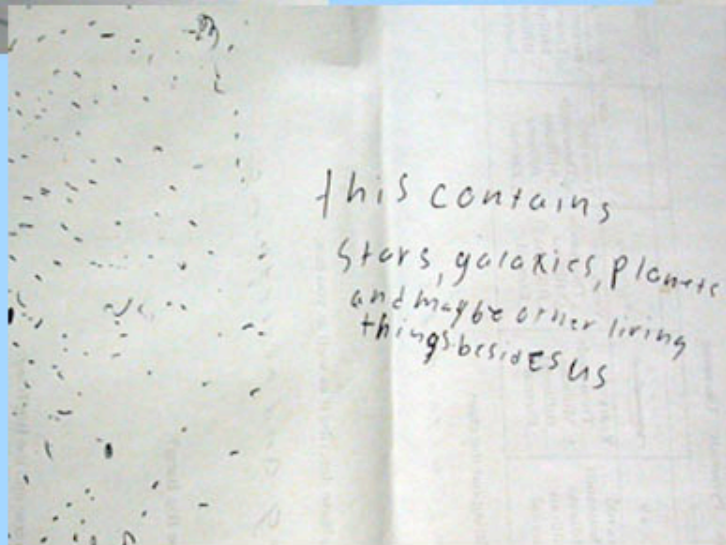
Student survey of >500 students designed to provide a baseline for summative evaluation.

Key misconceptions (>50% of students):

- Scale
- Time: Everything formed simultaneously in the Big Bang
- Expansion: into surrounding empty space.

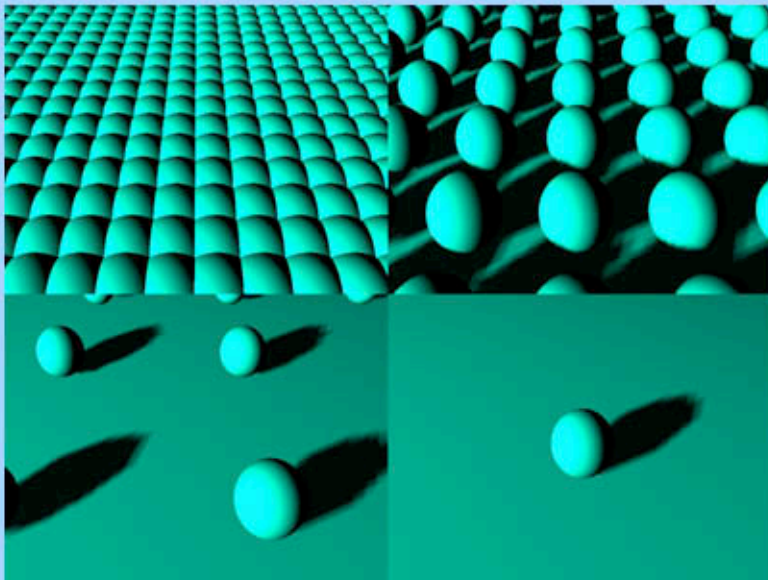
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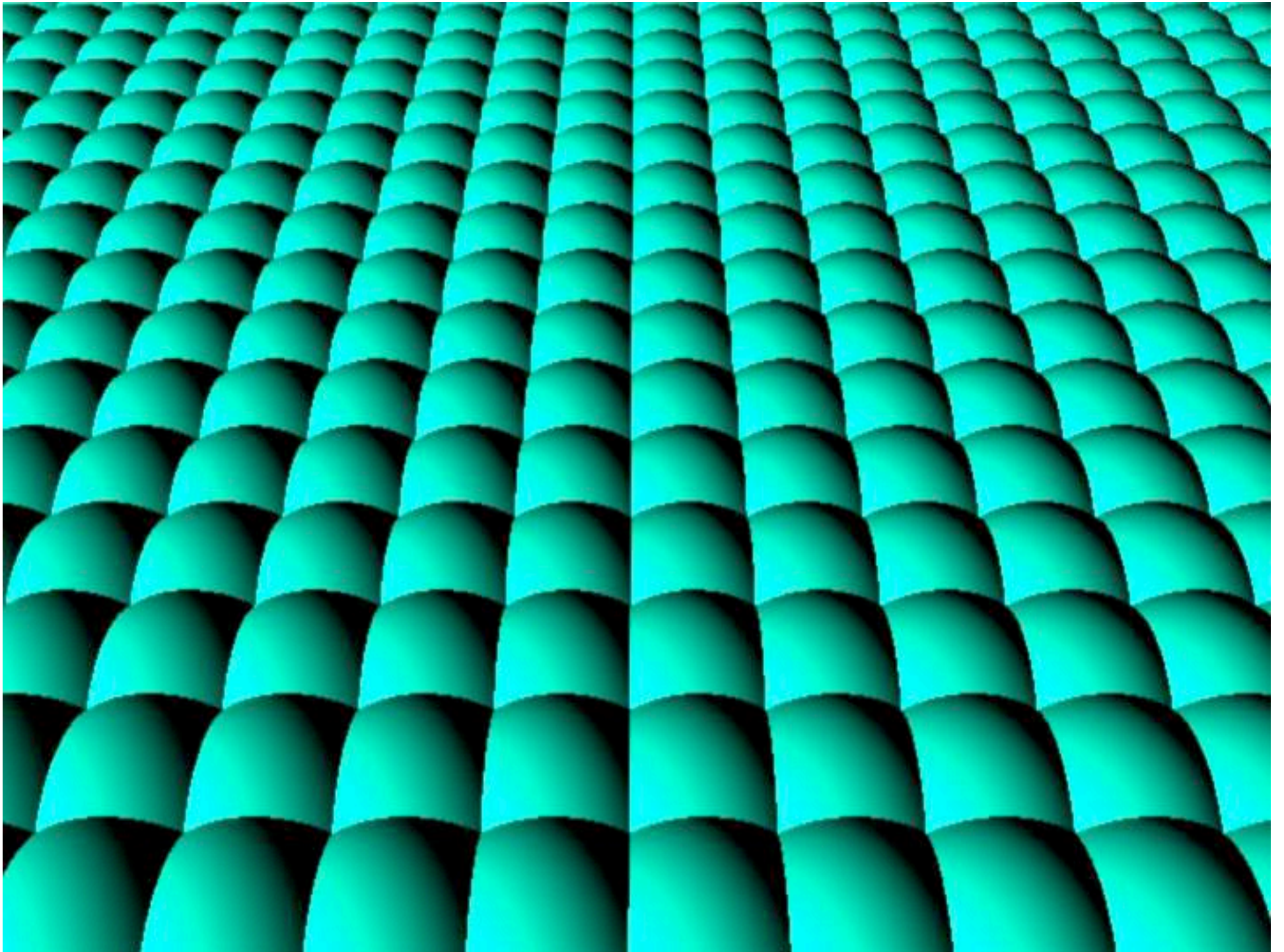
Examples of student drawings from the survey:

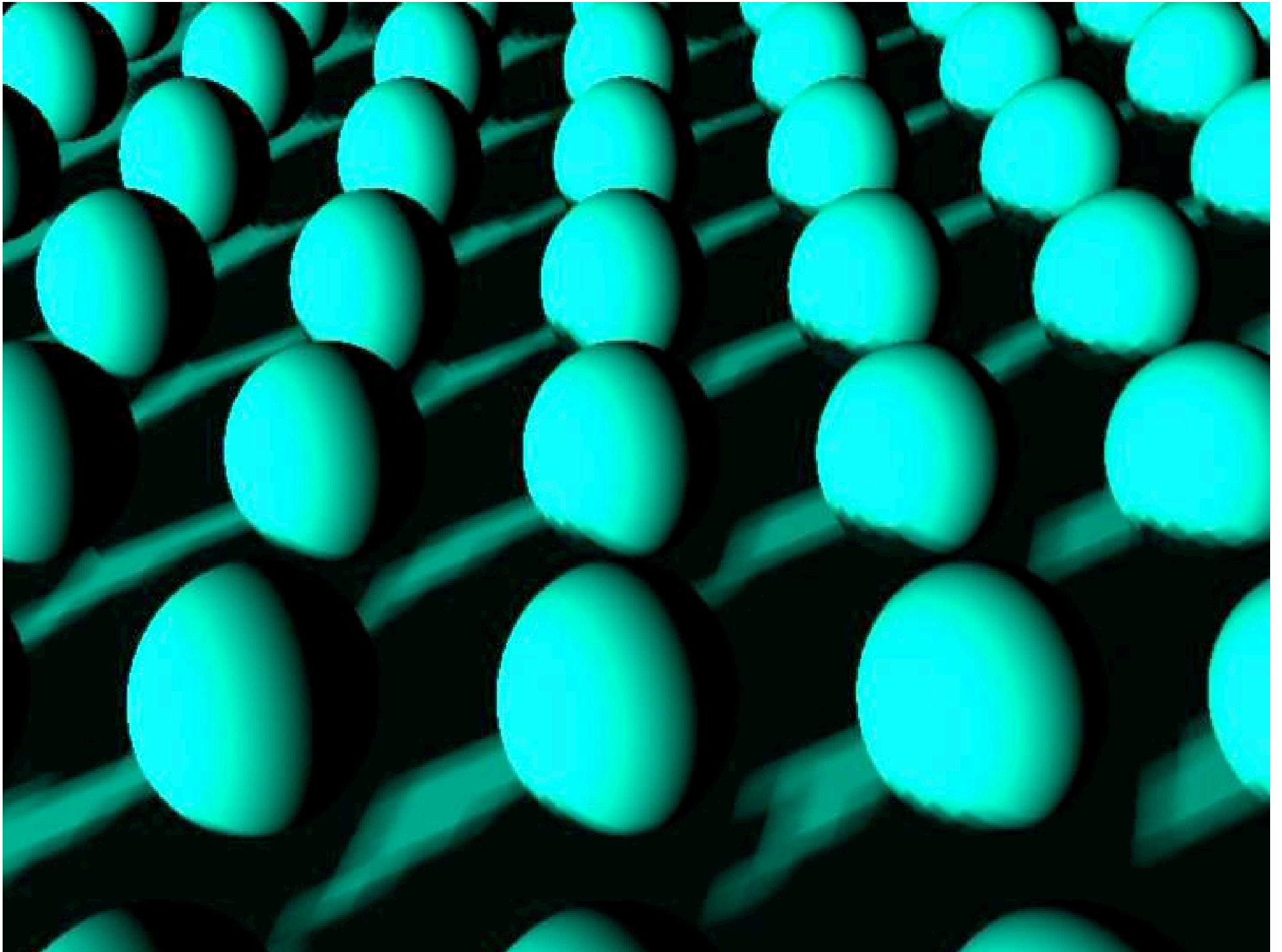


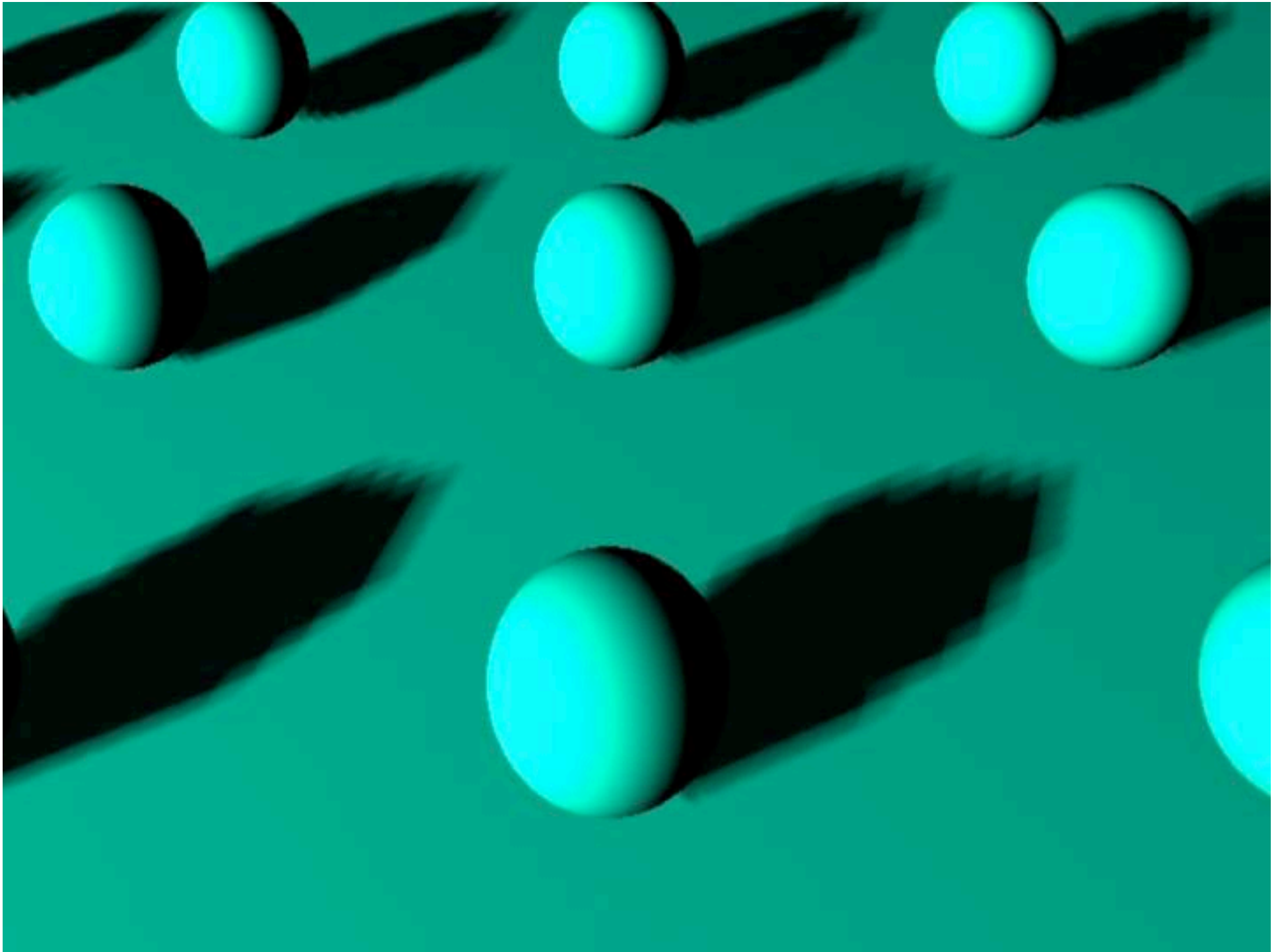
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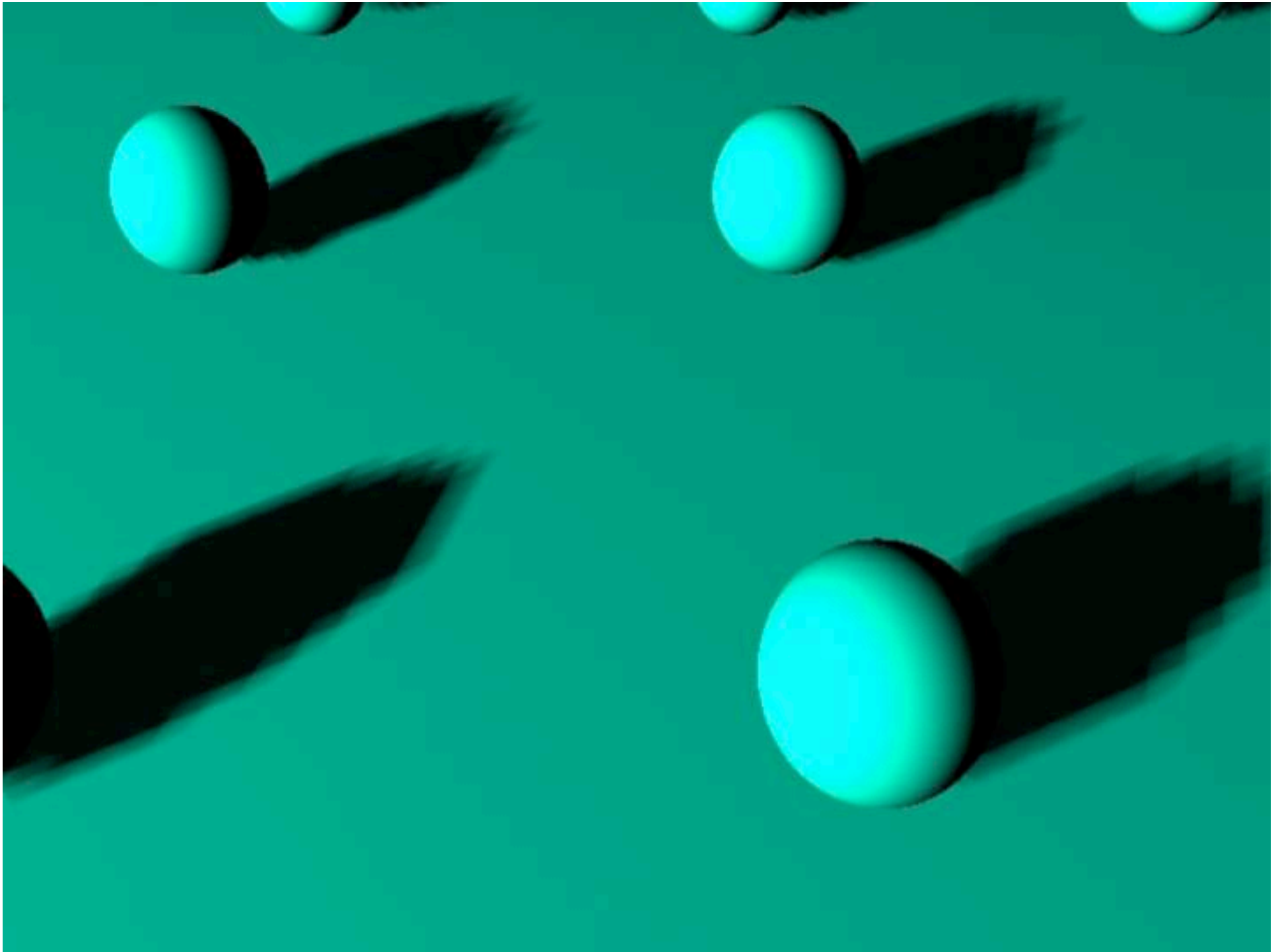
In this project, we tried to develop abstract concepts by using abstract representations. In this example, we show the expansion of space by representing matter as identical spheres that move apart over time.

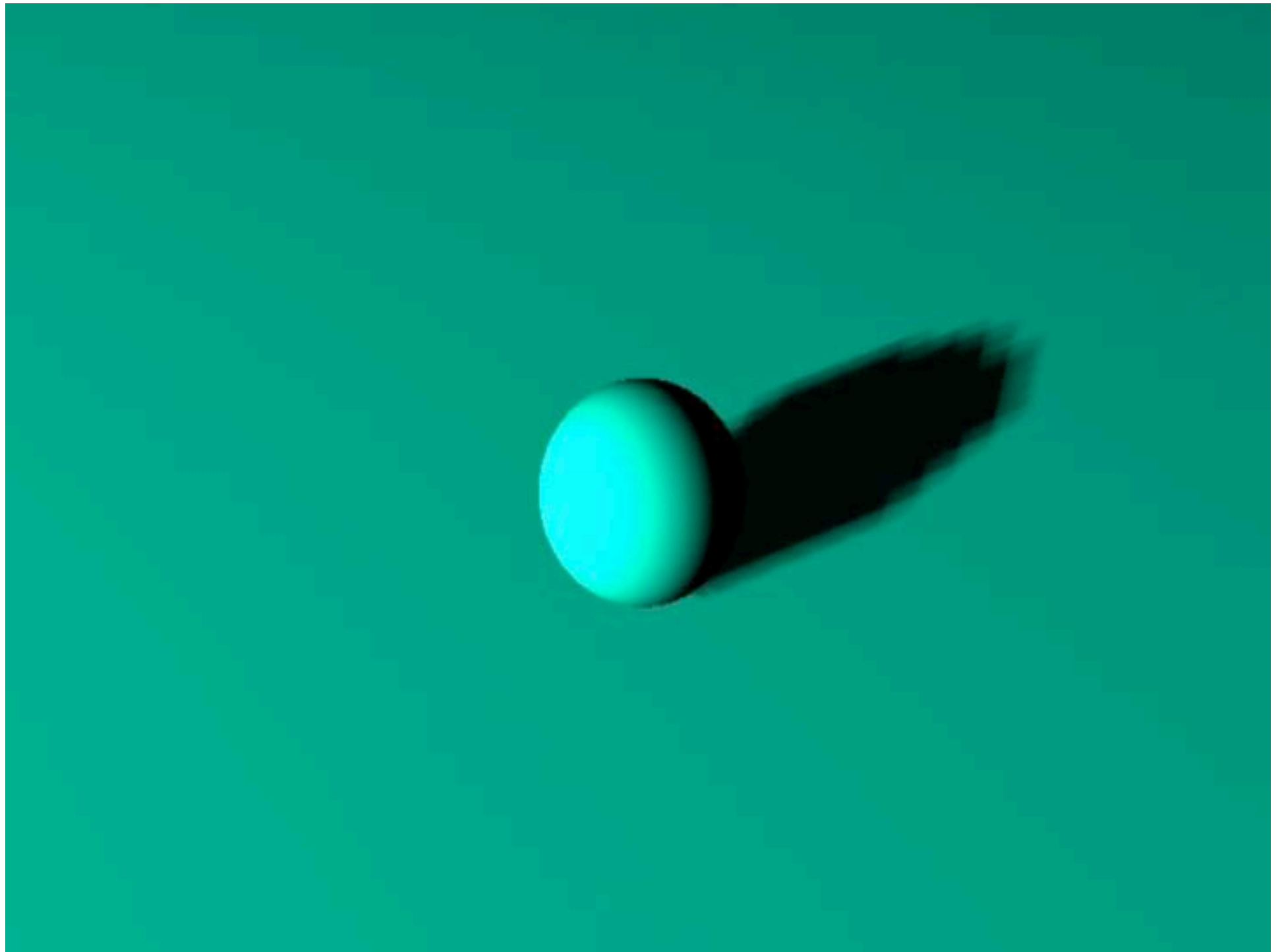












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NASA UniverseForum

<http://www.cfa.harvard.edu/seuforum/>