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Exploring Students' Ideas About Cosmological Concepts[1]

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As scientists seek to understand the nature of our Universe, we can also explore our students' understanding of cosmological concepts. What ideas about the origin, evolution, and fate of our Universe do students bring with them to the classroom? In this talk, I will describe an ongoing study in which students' preinstructional ideas are examined. Topics under investigation include the age of the universe; structure and composition, including dark matter and dark energy; the Big Bang; and how astronomers come to understand these topics. Approximately 1000 students have responded to open-ended questions at the start of their introductory astronomy courses. Analysis of the responses, through an iterative process of identifying self-emergent themes, suggests that students have a number of common ideas. For example, students frequently conflate structure terms such as solar system, galaxy, and universe or do not understand the relationship between the terms; believe the universe to be infinitely old; and may not be aware of dark matter or dark energy. Additional themes, as well as the frequencies of typical responses, will be discussed, and future research efforts.

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