

WHEN DO WE STOP DIGGING? CONDITIONS ON A FUNDAMENTAL THEORY OF PHYSICS

TALK BY
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In seeking an answer to the question of what it means for a theory to be fundamental, it is enlightening to ask why the current best theories of physics are not generally believed to be fundamental. This reveals a set of conditions that a theory of physics must satisfy in order to be considered fundamental. Physics aspires to describe ever deeper levels of reality, which may be without end. Ultimately, at any stage we may not be able to tell whether we've reached rock bottom, or even if there is a base level—nevertheless, I draft a checklist to help us identify when to stop digging, in the case where we may have reached a candidate for a final theory. Given that the list is—according to (current) mainstream belief in high-energy physics—complete, and each criterion well-motivated, I argue that a physical theory that satisfies all the criteria can be assumed to be fundamental in the absence of evidence to the contrary.

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