[SQUEAKING]

[RUSTLING]

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MARKUS KLUTE: Welcome back to 8.701. So we are going to start a new chapter in this class, Feynman Calculus. The purpose of this very first introduction is to just set the stage. And we do this by recapping what we've discussed so far in the first three weeks of this course.

So first we introduced the player in the field-- the elementary particles, the matter particles, and the force carriers. We have seen that there are three generation of fermions, that there's leptons and quarks. We have seen that they, eh, in principle, interact in different ways with those force carriers. We have seen that there are three kinds of charges, or three kinds of interactions-- the electromagnetic interaction, the weak interaction, and the strong interaction.

Then we moved on and had a quantitative discussion of relativistic kinematics. So there's quite a set of useful problems we can look at. For example, we are wondering, how much energy does my proton need in a beam on a fixed target where we want to produce antiprotons? So those problems we were able to discuss and quantitatively figure out what the answers to those questions are.

Then we looked at Feynman diagram. We are able to read them and understand what they principally mean. And then we had a discussion last week on symmetries. And we introduced parity, we introduced charge conjugation, we looked at CP and CP violation.

We had a qualitative discussion on decays and scattering. We defined what a geometrical cross-section is. And now we are really starting the quantitative discussion of particle dynamics. We do this now in the next video by introducing Fermi's golden rule. And then we study a toy theory which is simplified such that the algebra involved is not going to be too much of a hassle, so we can focus on understanding the following Feynman rules in order to calculate decay rates and scattering cross-sections.