

Physics 2019 v1.2

Supporting resource: Feynman diagrams

Feynman diagrams: Representing particle interactions

Feynman diagrams appear in the subject matter of the *Physics 2019* syllabus, as shown in the syllabus excerpt below (from Unit 4, Topic 3: Particle interactions).

Subject matter

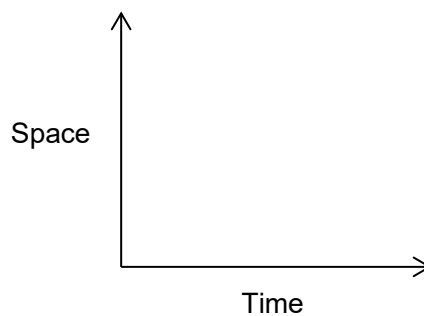
- explain the following interactions of particles using Feynman diagrams
 - electron and electron
 - electron and positron
 - a neutron decaying into a proton

This resource shows the representation conventions adopted in the *Physics 2019* syllabus for Feynman diagrams.

Conventions

The following conventions should be adhered to when constructing Feynman diagrams.

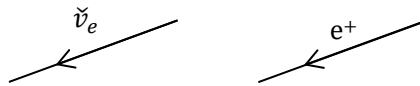
1. Represent space on the vertical axis and time on the horizontal axis.



2. Represent particles as straight-line arrows in the direction of time, with a letter indicating the type of particle represented.



3. Represent antiparticle arrows pointing in the opposite direction to time.



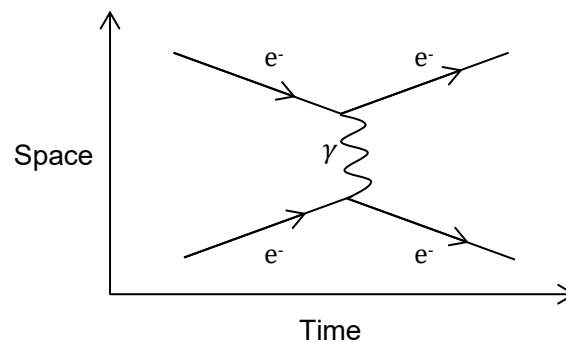
4. Represent bosons as wiggly lines, with a letter indicating the type of boson represented.



Feynman diagrams in the syllabus

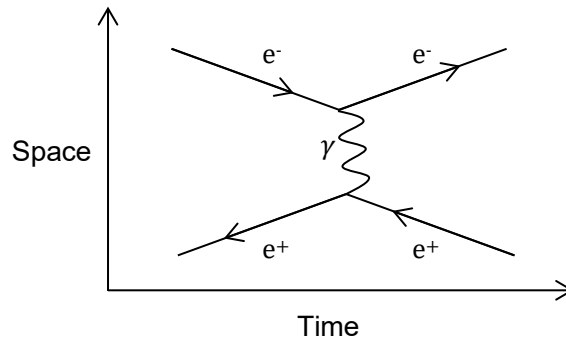
The *Physics 2019* syllabus requires students to represent three sets of particle interactions using Feynman diagrams. Examples of these diagrams are shown below.

Electron and electron

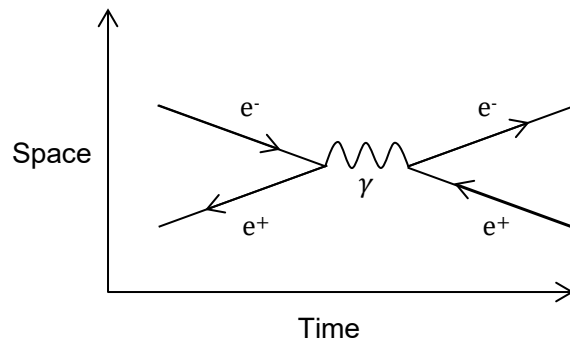


Electron and positron

Bhabha scattering



An electron and positron annihilating into a photon, only to then 'pair produce' another electron and positron



Neutron decaying into a proton

Note: Students should be able to use both of the following diagrams.

