

Bubble Chamber Basics

NOVA Activity **The Elegant Universe**

Physicists once used a device called a bubble chamber to record particle interactions. The illustration on your *Tracking Particle Paths* activity sheet represents the kinds of particle interactions that were commonly recorded by bubble chamber detectors. Today, bubble chambers have been replaced by detectors that can measure energies a thousand times larger, and can look for particles a billion times more rare. However, bubble chamber tracks are useful to show the kinds of interactions that can occur between particles. Read the information in the *Tracking Particle Paths* activity sheet to learn more about bubble chambers and the kinds of tracks they produce. Then answer the questions below.

Questions

Write your answers on a separate sheet of paper.

- ① Which letter(s) represent electron-positron pairs in this illustration? Which side of the pair(s) represents the electron? Which side represents the positron? Explain your answer.
- ② Which track(s) show a Compton electron that has been knocked out of an atom? Explain.
- ③ Assuming that tracks C and D were formed by the same kind of particles and are the actual lengths shown, which pair had greater momentum? Explain.
- ④ Identify a track that did not come from the particle beam. How do you know? Where might this track have originated?
- ⑤ What might track F represent? Explain.
- ⑥ What were the main types of particle interactions recorded?
- ⑦ What particles would not leave tracks in a bubble chamber? How can you detect where unseen particles would have been in the illustration?