

## 8.1: The System

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### an isolated island of violence

Particle physics is one of the great adventures of our time. No one can venture into the heart of it without momentum as guide and lamp. Particles clash, yes. But however cataclysmic the encounter, it always displays one great simplicity. It takes place on a local stage, an island of violence, apart from all happenings in the outside world. In other isolated arenas of action football players form a team, actors a troupe, soldiers a platoon; but in a battle of matter and energy, the participants receive the name system.

#### ***Keep score of momentum for the system***

What the action starts with, what particles there are, what speeds they have, what directions they take: that's the story of the system at the start of the action. We may or may not pursue in all detail every stage of every encounter, as we view the scenes of a play or watch the episodes of a game. However, nothing that claims to be an account of the clash, brief though it may be, is worthy of the name unless it reports every participant that leaves the scene with its speed and its direction. Departing, they still belong to the system. Moreover, at every step of the way from entry to departure we continue to use for the collection of participants the name system.

The child keeps count of who wins and who loses in the shoot-out before he or she learns to ask questions of right and wrong, of why and wherefore. We likewise keep tabs on what goes into an encounter and what comes out only to the extent of broadcasting the participants' momenta before and after the act of violence. We do not open up in this book the more complex story of the forces, old and new, that govern the chances for this, that, and the other outcome of a given encounter. We limit ourselves to the ground rules of momentum conservation in an isolated system.

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