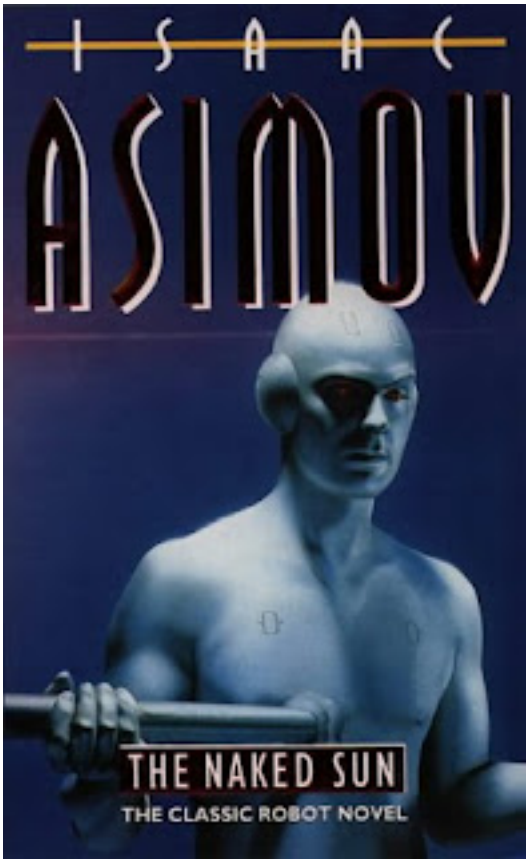
Asimov's New Guide To Science 1993 Pdf Free Download



download: Now that the groundwork has been done, it's time to start investigating the peculiar behavior of particles that come in three forms: fermions (particles of matter, such as electrons or quarks), bosons (particles with no electric charge, such as photons), and gravitons (particles of mass but no matter). The first two are unified in a supersymmetry transformation. This transformation exchanges the fermions for bosons and vice versa, and does not affect the strength of the electromagnetic or the gravitational interactions. The last is special in its own way, and was forgotten for a while during the early stages of its development, but has since been revived. It turns out that all of these particles share some characteristics with each other. They always travel in pairs, such as an electron and a positron. They are all spin-½, and are always accompanied by an antiparticle of the opposite charge. They all look pretty much the same to a casual observer, but they differ in ways too subtle for a description

that goes beyond the coarse-grained version presented in this guide. Particles with integer spins are fermions, while those with half-integer spins are bosons. Particles with integer spin are governed by special relativity, while those with half-integer spin are governed by a quantum theory. And so, now that we've seen how particles of different kinds are unified, let's take a look at the basics of how this unification works. To do this, it's best to start with something simple: a single particle of charge, spin, and mass. The interesting part of our model is that it can have either integer spin (the electron) or half-integer spin (the neutrino). Let's go with spin ½, to start. We'll also choose a charge of +2 and mass of 0. I know this is a long name, but for now we're not going to worry about the fine details. For now, we'll take the model seriously. A spin-½ particle is not a free particle. There is a potential that holds the particle bound to a particle of the same type and half its 82157476af