Table 1.3. SUSY Particles.

Particle	Spin	Sparticle	Spin
quark q_L, q_R	$\frac{1}{2}$	squark $\tilde{q}_L, \tilde{q}_R$	0
lepton ℓ_L, ℓ_R	$\frac{1}{2}$	slepton $\tilde{\ell}_L, \tilde{\ell}_R$	0
photon γ	1	photino $\tilde{\gamma}$	$\frac{1}{2}$
gluon g	1	gluino $\tilde{g}$	$\frac{1}{2}$
W	1	wino $\tilde{W}$	$\frac{1}{2}$
Z	1	zino $\tilde{Z}$	$\frac{1}{2}$
Higgs H	0	shiggs $\tilde{H}$	$\frac{1}{2}$

possible existence is taken seriously since SUSY has powerful theoretical attractions. They may be accessible to discovery with the upcoming colliders.

The huge GUT energy scales are approaching the Planck mass

$$M_{\text{Planck}} = (G_{\text{N}})^{-\frac{1}{2}} = 1.2 \times 10^{19} \text{ GeV} ,$$

where G_{N} is Newton's gravitational coupling constant. Here the quantum effects of gravity become important, which makes it essential to include gravity in the theory at such scales.

The latest theoretical developments concern supersymmetric strings (*superstrings*). In string theory the fundamental objects are one-dimensional strings rather than points in space. A string can have excitations (vibrational, *etc.*); the zero mass modes can represent fundamental particle states, both bosons and fermions. Superstring theories have some remarkable properties, for example their quantization requires 10 space-time dimensions and their anomalies are cancelled with fermions appearing in chiral representations only if the gauge symmetry is $E_8 \times E_8$. It is postulated that the extra dimensions are spontaneously *compactified*, *i.e.* they curl up on themselves