Some Big Questions that Remain in Physics

The big bang theory of the creation of the universe is supported by many experiments and calculations, but some big questions are unanswered:

What happened before the big bang?
What happens inside of black holes?
Where did the energy come from in the first place?
Are there other universes?
...

Why did nature choose certain values?

There are certain measured universal **dimensionless** ratios in physics which have particular, seemingly arbitrary values:

Electromagnetic coupling constant $\alpha = \frac{e^2}{\frac{h}{2\pi} c\, 4\pi\epsilon_0} = 7.297352570 \times 10^{-3}$

Gravitational coupling constant $\alpha_G = \frac{G m_e^2}{\frac{h}{2\pi} c} = 1.753 \times 10^{-45}$

Strong force coupling constant $\alpha_S \approx 1$

Proton-to-electron mass ratio $\frac{m_p}{m_e} = 1836.152672472$

Because these numbers are dimensionless, they do not depend on our system of measurements. Physicists believe that all technological civilizations would recognize these numbers as well as the mathematical constants $\pi = 3.14159265358979323846...$ and $e = 2.71828182845904523536...$, **but why do they have their particular value? Why did our universe choose these values? Some scientists have suggested that if these values were much different, atoms and therefore life could not exist!**