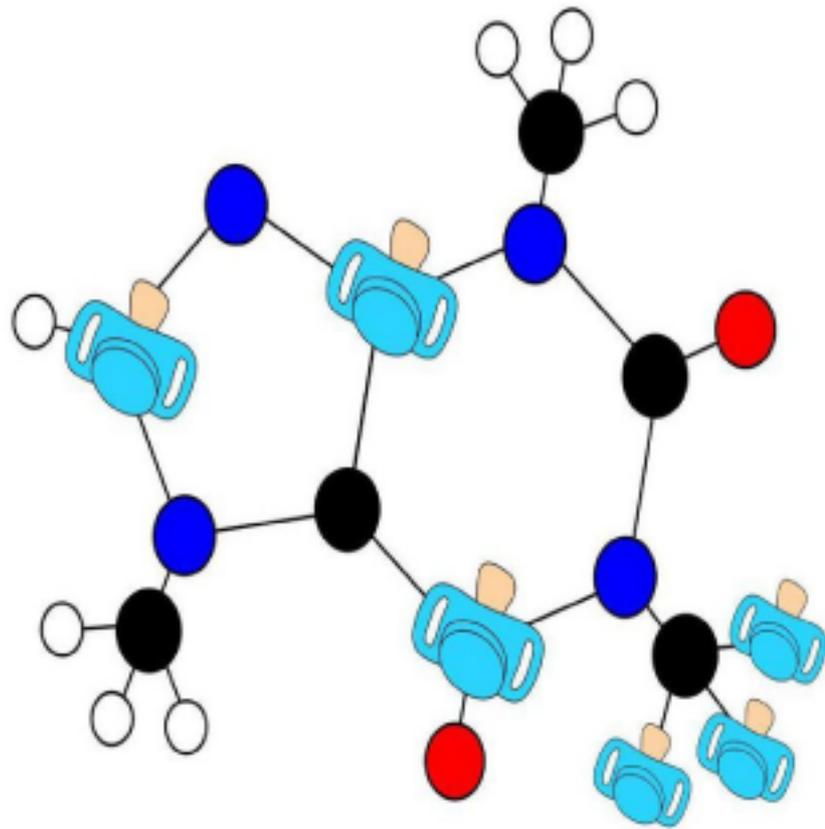


Quantum Information for Babies



by Chris Ferrie

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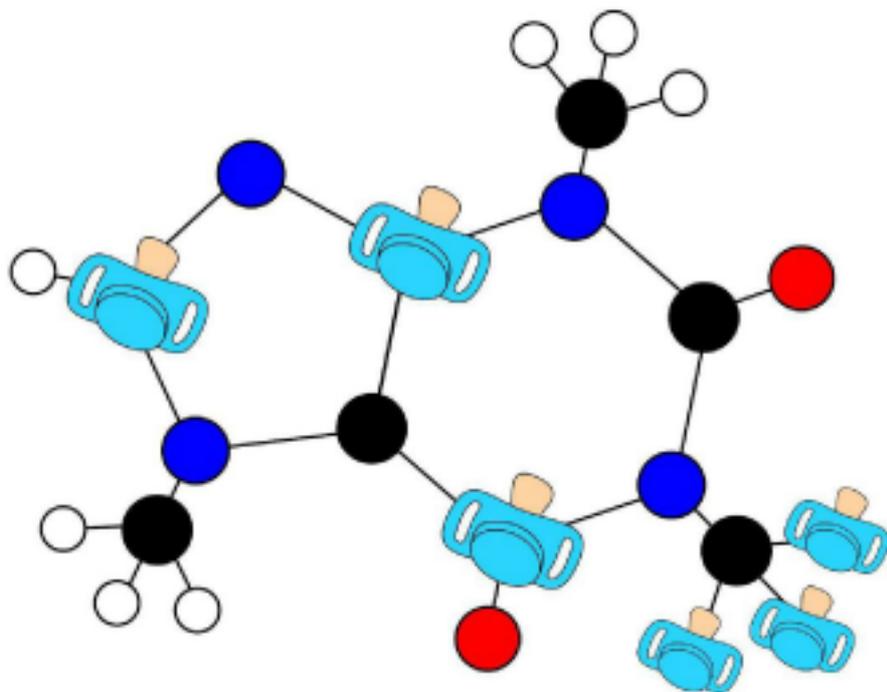
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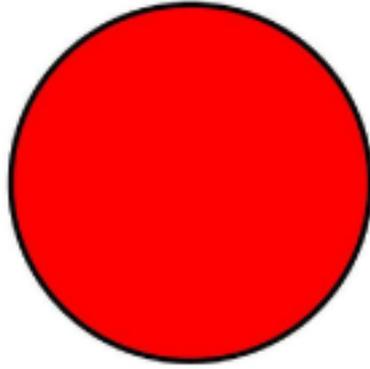
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Quantum Information for Babies 🎧

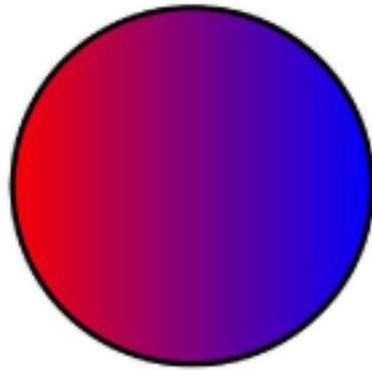


by Chris Ferrie



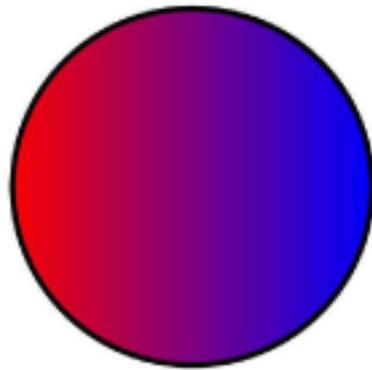
This is a ball. 🗣️

This ball can be



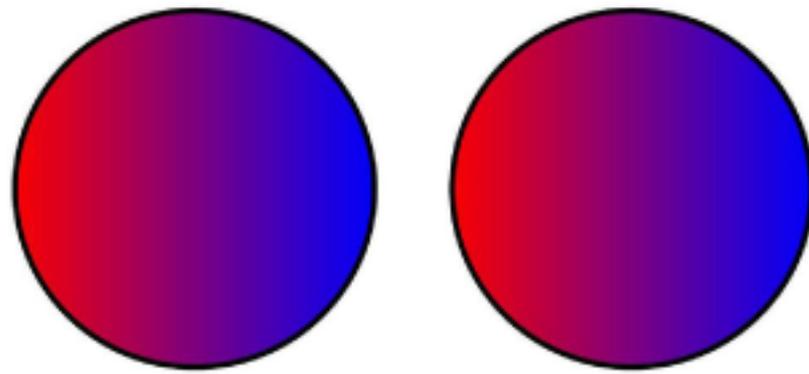
Red or blue.





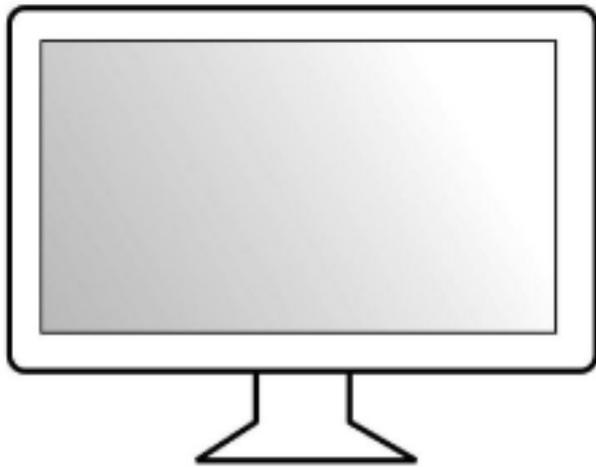
**We need 1 bit of
information to record
the color of this ball.**



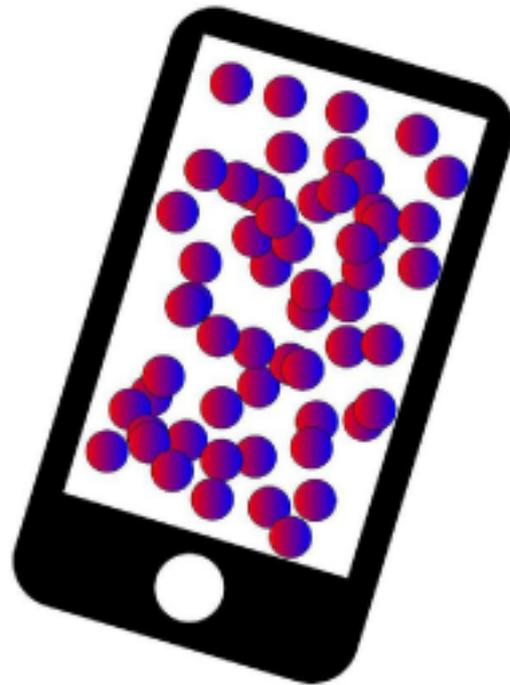


**We need 2 bits of
information to record
the color of two balls.**



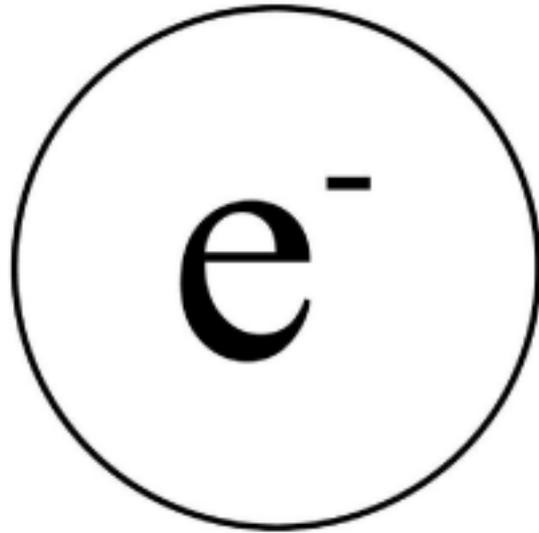


**These are computers
which can store
many bits.** 🎧



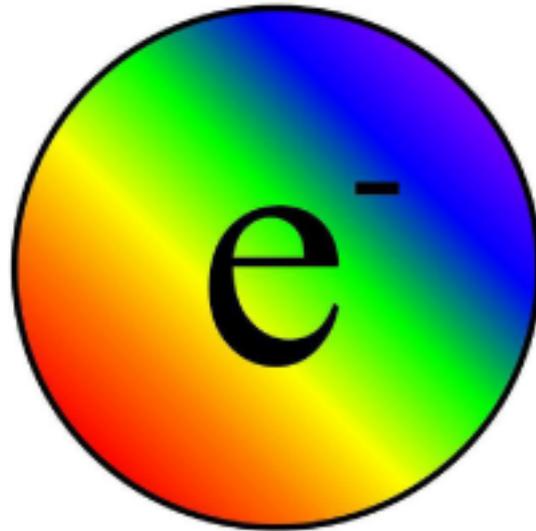
**This phone can store
1 million bits
of information.**





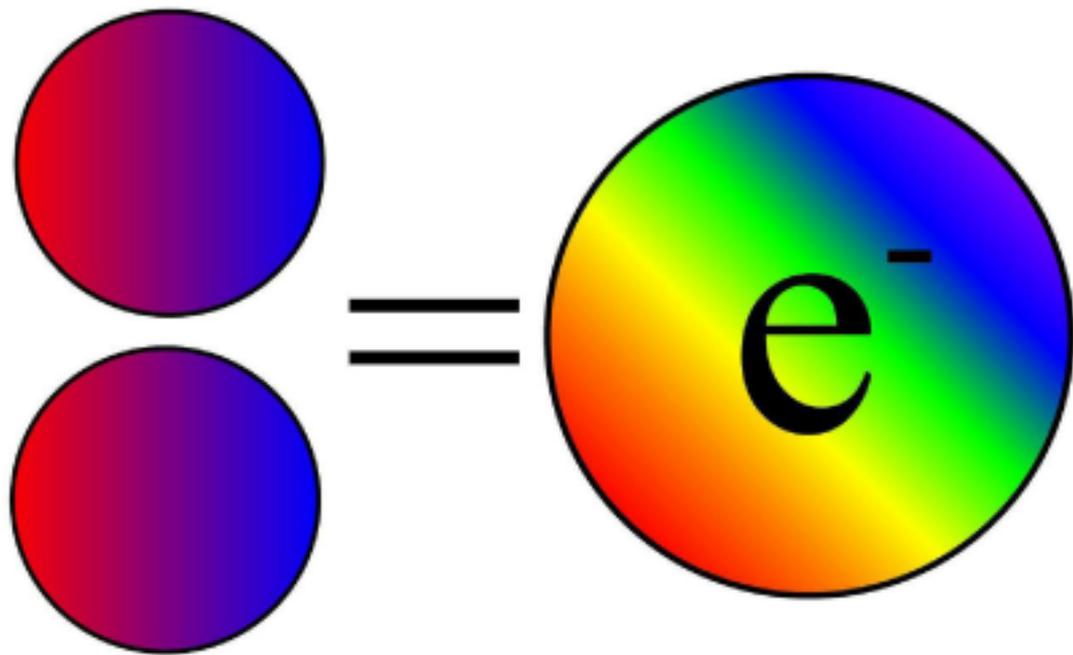
**This is an electron.
A "quantum" ball.**





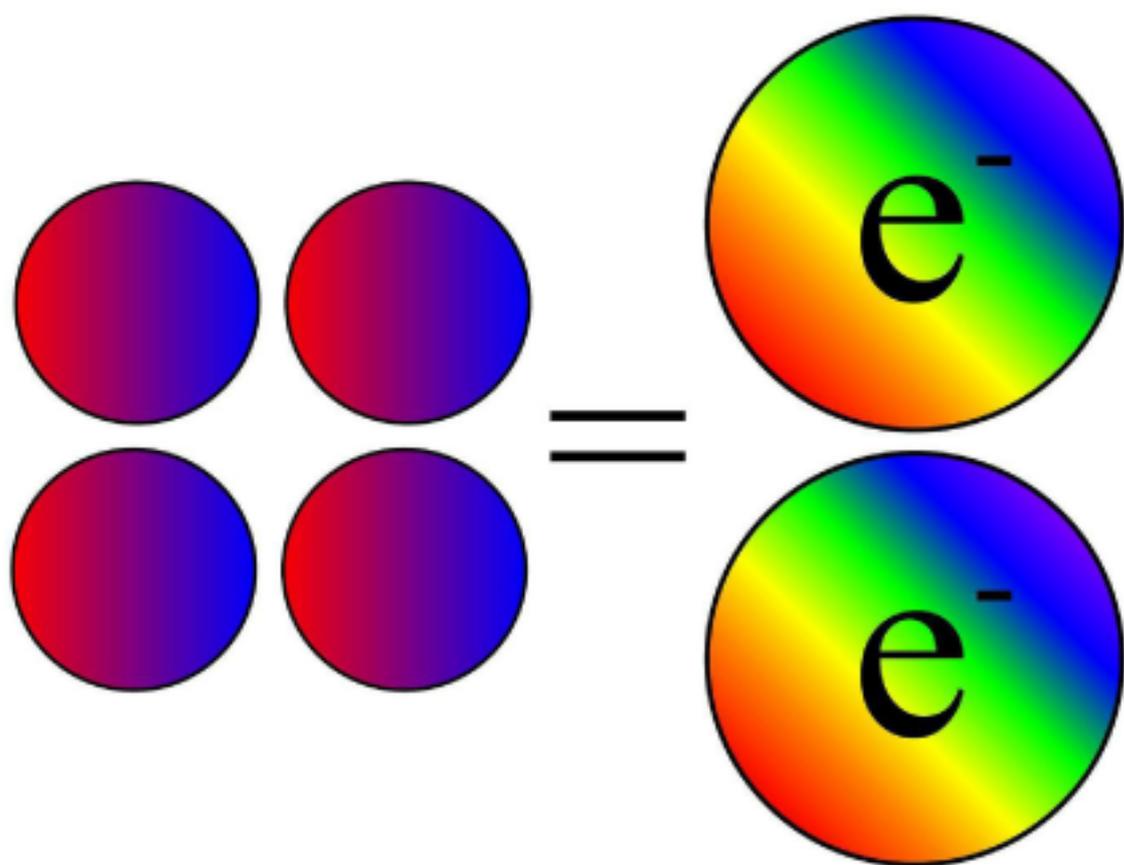
**An electron stores
a quantum bit or
qubit of information.**





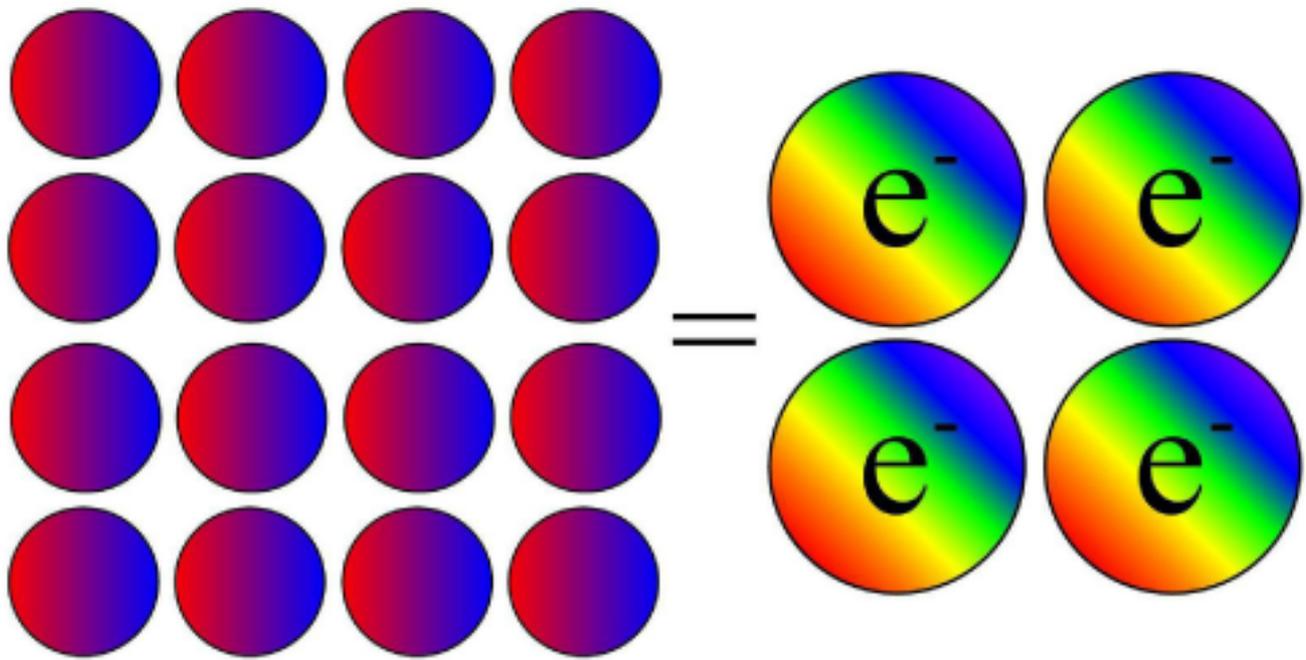
If 2 bits are needed
to describe 1 qubit,





Then **4 bits** are needed
to describe **2 qubits**.





**And 16 bits are needed
to describe 4 qubits.**





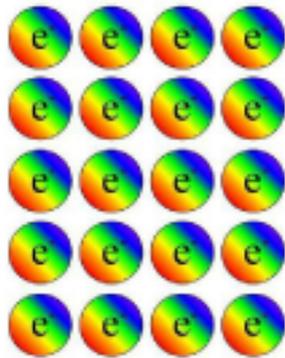
**Remember the phone
that can store
1 million bits?** 🎧



**It can only store
20 qubits of
information!**



20 + 1

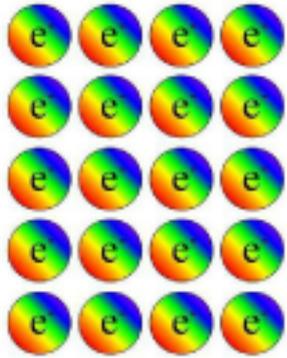


=



**21 qubits requires
2 phones. 🎧**

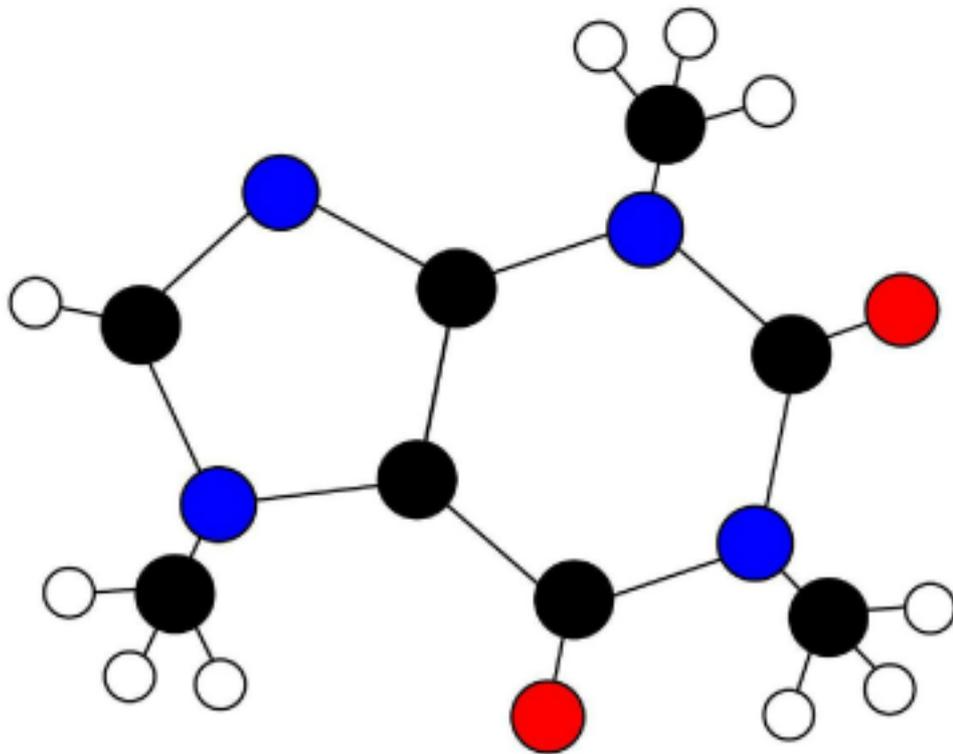
20 + 2



=



**22 qubits requires
4 phones. 📞**



**To store the
information in my
favorite molecule**



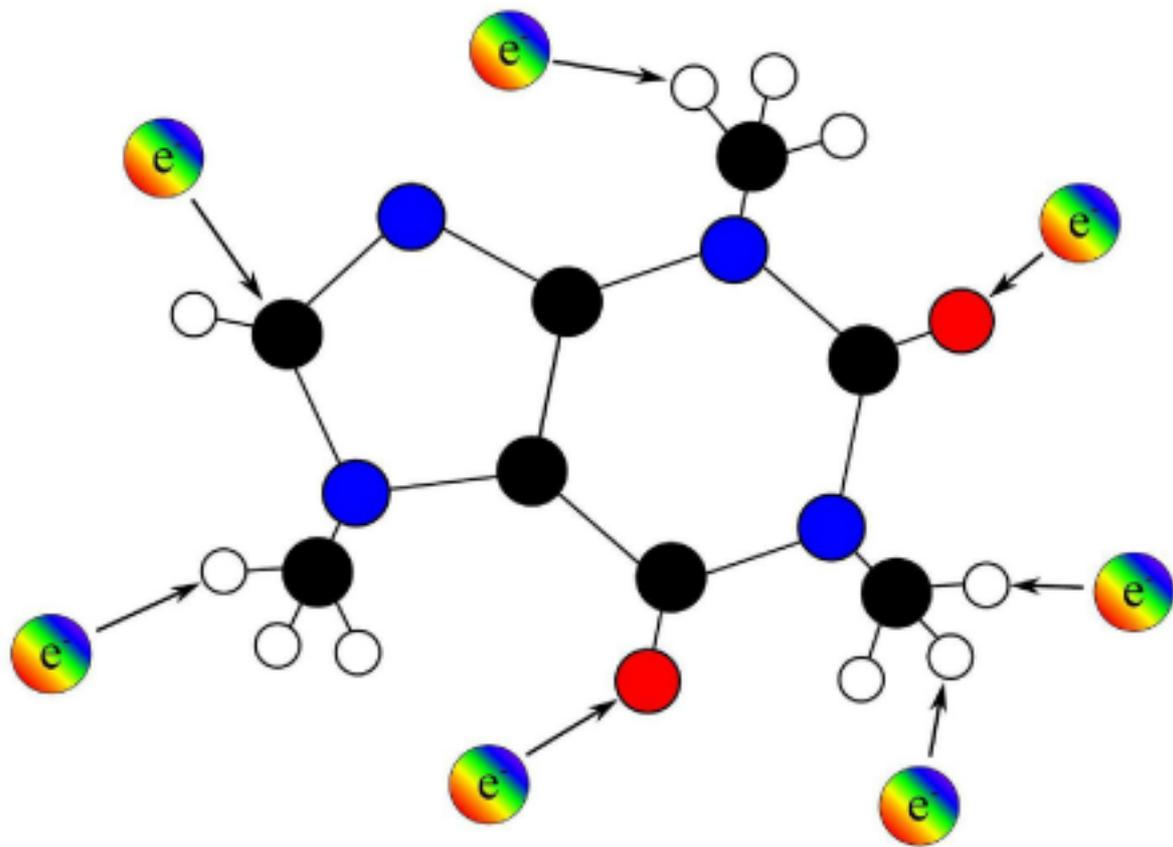


**would require all the
phones on earth! 🎧**



**What's that baby?
You have an idea?**



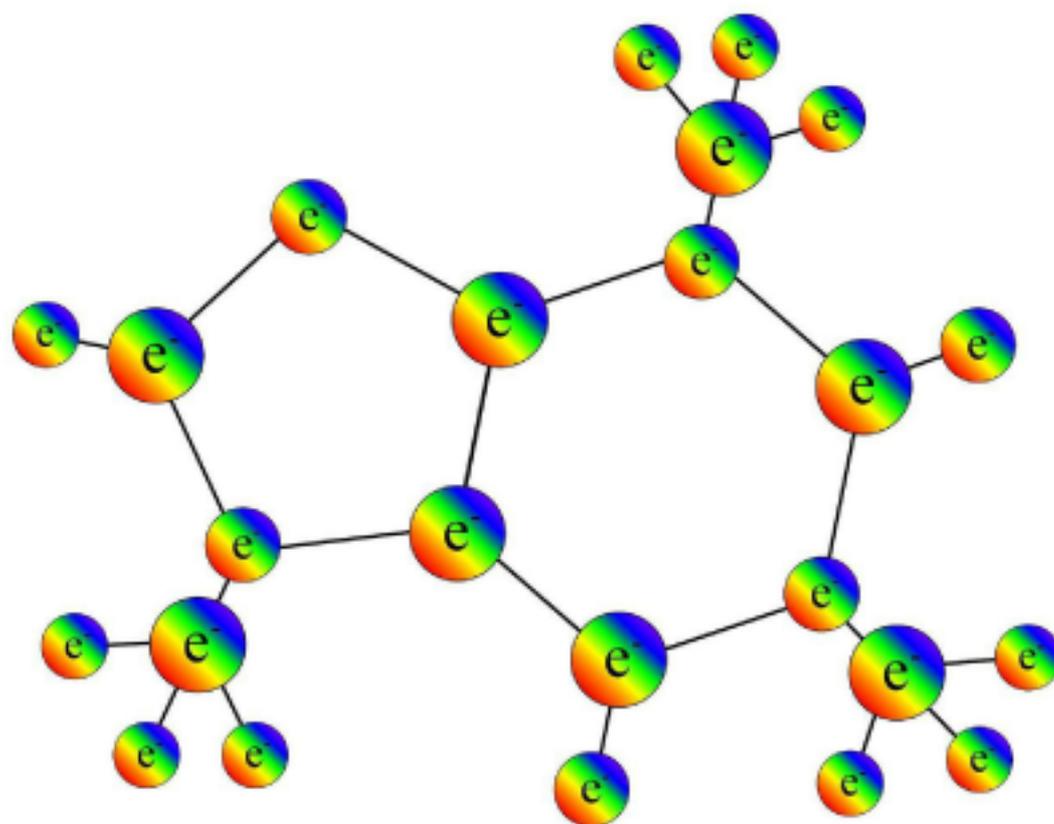


**We can use quantum
systems to store
quantum information!**





🎧 **What took all the phones in the world...**



**can be done with a
single molecule!**



Chris Ferrie is a physicist, mathematician and father of three budding young scientists. He obtained his doctorate in Mathematical Physics from the University of Waterloo in Waterloo, Canada and currently holds a postdoctoral fellowship at the University of New Mexico in Albuquerque, New Mexico.

Chris believes it is never too early to introduce children to the wild and wonderful world of physics!