

pass through it. It wasn't until the universe was 380,000 years old that it thinned enough for the first light to travel across the cosmos.

Astronomers call this ancient light the *cosmic microwave background*, or CMB. It's still detectable today, although now it's very cold and faint. Reading about it, Kovac—just 14 years old at the time—became fascinated with the origin of the universe. He went on to study astrophysics and specialized in observing the CMB.

BIG-BANG RIPPLES

Meanwhile, other scientists were studying Guth's idea of

inflation and using it to make predictions. They determined that during the superfast expansion of the universe, tiny fluctuations or jiggles would generate ripples in the fabric of space called *gravitational waves*. If inflation actually happened, they said, those ripples should have imprinted a specific swirling pattern on the CMB light, just as waves at the beach leave marks in the sand.

In theory, the imprint could be used to test whether inflation happened: Astronomers could look for the swirling pattern from gravitational waves in the CMB. But Guth didn't get his hopes up.

No telescope sensitive enough to see the imprint of the ripples existed. "I never believed it would be possible to measure it," he says.

As telescope technology advanced, though, astronomers began to look for the pattern in the ancient CMB light. Kovac, now at Harvard University in Massachusetts, became a leader in the search.

Kovac led an international team of dozens of researchers, engineers, and students who built a sensitive telescope called BICEP2. They installed it at the South Pole, where the cold, clear

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10 BILLION YEARS

The expansion of the universe speeds up again, driven by a mysterious thing that scientists have named *dark energy*. They're still trying to figure out what it is.

13.8 BILLION YEARS

The expansion of the universe continues to accelerate today.