

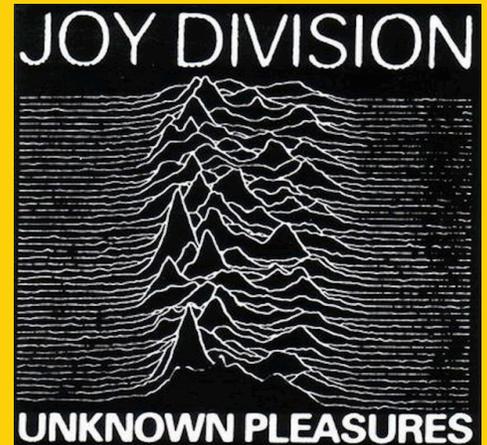
UNKNOWN PLEASURES OF KNOWN PULSARS

On average, pulsars are incredibly stable, with the period between pulses keeping time better than the best atomic clocks on Earth. But individual pulses from pulsars can show enormous variations. This can come from interstellar “twinkling” of the pulsar or from changes in the emission of the pulsar itself.

Inspired by the 1979 cover for the Joy Division album “Unknown Pleasures”, which featured individual pulses from the first pulsar ever discovered, we have worked out a procedure for data-driven 3D printing of individual pulses. We start with data from the NRAO/SkyNet 20m radio telescope, which is ideal for student use. After standard pulsar processing, we use a simple python script to turn the data into a 3D model that can be printed anywhere. We can also use the data to create models for laser-cutting individual pulses than can be laminated together.

Different pulsars have different behavior. Some are very steady, some turn on & off randomly (called “nulling”), some twinkle a lot, and some do all of these. The 3D models serve as tactile and visual explorations of those behaviors.

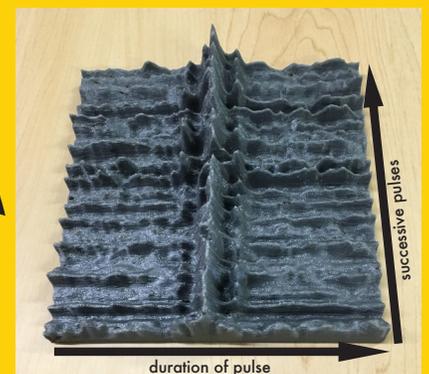
For more information, or to find files to print your own, see the URL below.



NRAO 20m telescope



student observers



3-D printed model of individual pulses



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