

# Deep Pulsar Searches in Ultra-Faint Dwarf Galaxies

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Our search for pulsars in ultra-faint dwarf galaxies will address three main science goals:

1. The discovery of a pulsar in a UFD would be the **first known extragalactic pulsar outside of the Magellanic Clouds**.
2. Placing observational limits on the pulsar population in UFDs will provide the first **constraint on the high-mass initial mass function** (IMF) of the oldest dynamically unevolved stellar populations.
3. By measuring the dispersion of the pulses from a pulsar in a UFD, we **probe the electron density of the intergalactic medium** towards that line of sight.

We justify each of these goals in turn.

## 1. First of its Kind

## 2. Constraining the High-Mass IMF

The initial mass function is the distribution of stellar masses in a stellar population at the beginning of star formation. The IMF determines the evolution of the population and is a crucial input in models of synthetic stellar populations. The form of the IMF affects many galaxy parameters derived from stellar population synthesis. The form of the IMF also places a constraint on star formation theory, which must predict the observed IMF. In the Milky Way, the IMF is typically parametrized by the similar Kroupa (2001) or Chabrier (2003) laws with little variation across a range of star-forming environments (Bastian et al. 2010). A departure from this “universal” IMF indicates a star formation process that depends on environment.

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## 3. Probing the Intergalactic Medium

## REFERENCES

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Kroupa, P. 2001, MNRAS, 322, 231

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