

Abstract Submitted
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**Design and Implementation of
a Josephson Junction Spectrometer**¹ CAGLAR GIRIT, Collège de France &
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Josephson tunnel junction can be used as an on-chip absorption spectrometer at
frequencies up to several hundred gigahertz. As a result of the AC Josephson effect,
a voltage biased junction acts as a microwave source. When emitted photons are
absorbed in the junction's electromagnetic environment, a dc Cooper pair current
flows (inelastic Cooper pair tunneling). By measuring this dc current as a func-
tion of applied voltage—the junction's current-voltage characteristic—one obtains a
spectrum of the electromagnetic environment. We describe the design of a Joseph-
son junction spectrometer which seeks to optimize bandwidth, sensitivity, coupling
and linewidth. We present measurements of the spectra of miniature on-chip *LC*
circuits with resonant frequencies in the 25-100 GHz range. Our Josephson junction
spectrometer will be used to study level transitions in mesoscopic systems.

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