For two nights starting Tuesday, a theater in downtown Brooklyn will be transformed into space—not the prosaic kind, which in this city means any area surrounded by walls and a roof, but rather the suggestive sort that suffuses the whole of the cosmos. It will be outer space, and astral travelers within it will be suited up with nothing more than luxe wireless headphones.

Such is the scenario for Kid Koala's Space Cadet Headphone Experience, an ambitious quasi-concert event to be staged at the Irondale Center in Fort Greene and conceived with a desire to tune in and chill out.

"I’ve done thousands of shows in more normal formats and in straightforward DJ situations, but at one point I thought, ‘There’s got to be more to life than this, musically at least,’” said Eric San, the 36-year-old artist and musician behind the Kid Koala guise.

Since the mid-1990s, Mr. San has been instrumental in the evolving realm of turntablism, in which the art of scratching records has expanded in countless impressionistic ways. Some of those apply to playful approaches to sound, as in Kid Koala's epochal collage song of 2000, "Drunk Trumpet," made up of anachronistic jazz records manipulated by hand to sound like they’re soloing in an intergalactic band. Other methods lean toward imaginative new modes of presentation, which can differ from the typical concert spectacle.

"The idea was to make this a kind of pop-up planetarium, a place where people can come and feel like they’re in another universe, floating through space,” said the event’s set designer, Corrine Merrell, 32, who worked with Mr. San on the project from the start. (They are also married, with two young daughters at home in Montreal.)

Contrary to their expansive subject, they also aimed for compactness. "We wanted to tour..."
The show’s design features inflatable pod chairs on which the audience is encouraged to lounge, plus screens that flicker with animated images inspired by Kid Koala’s graphic novel, “Space Cadet,” published last year with a soundtrack CD inside. The story focuses on a heart-rending bond between the namesake cadet—“the sweetest astronaut on this (or any) planet”—and her faithful guardian robot. The music suits the mood with ambient electronic atmospheres and stirring refrains played on turntable and piano.

"Several people have told me it made them cry or compelled them to reconnect with their family," Mr. San said. "I was trying to bring back the idea of connectivity, across distance, time, technology and all of these things that can help to associate people. It was a very personal book with very personal music, and I’m just happy when people are moved by it."

The music was recorded mainly at home on headphones, so as not to disturb his newborn daughter sleeping nearby. Hence the idea for the live headphone performance.

"In a way, it’s a very anti-social social event," Mr. San said. "But everyone in headphones is tuned into the same channel and having the same very personal experience. It runs parallel with the characters in the story, who are light years apart but bonded at the same time."

Past incarnations of the show—at sites including a Buckminster Fuller-built geodesic dome in Montreal and scattered tour stops across Europe—have appealed to children enthralled by storybooks as well as adults invested in artistic abstraction. So the two-night, three-show stand in Brooklyn will include an early evening engagement on Wednesday for the younger set.

Along with the headphone concert comes a temporary gallery set up for exploration in advance, with a display of vintage space-age album covers, etched drawings from "Space Cadet" and a collection of Kid Koala’s odd musical contraptions, including a German magnetic disk recorder from the time before tape.

"It’s fun to see people play with this stuff," Mr. San said. "I wanted to create an experience, and if it somehow resonates for people within their own lives, then that’s great."