Briloullin simultaneous interrogation (Ramot)

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Methods and systems used to perform sweep-free stimulated Brillouin scattering-based fiber optical sensing are described.

In one aspect, a method includes interrogating different parts of a Brillouin gain spectrum using multiple optical tones in an optical fiber.
The interrogating includes sending at least two pump tones into the optical fiber from one end of the optical fiber, such that a frequency spacing between the pump tones is larger than a width of the Brillouin gain spectrum. The interrogating also includes sending at least two probe tones into the optical fiber from another end of the optical fiber, such that a frequency spacing between the probe tones is different from the frequency spacing between the pump tones.

The method further includes generating a sensing output based on the interrogating.

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