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(54) Title of the Invention: **Measurement of temperature using combination of rayleigh and raman backscatter interferometry**
 Abstract Title: **Measurement of temperature using combination of rayleigh and raman backscatter interferometry**

(57) A method of measuring temperatures, includes disposing a carrier in a borehole in an earth formation, the carrier having an optical fiber connected thereto, interrogating the optical fiber with a pulsed optical signal generated by a distributed temperature sensing (DTS) assembly, the pulsed optical signal having a first frequency, and receiving first reflected signals from the optical fiber, estimating an absolute temperature from the reflected signals, interrogating the optical fiber with an at least partially coherent optical signal from a phase sensitive optical time domain reflectometry (ϕ -OTDR) assembly, the at least partially coherent optical signal having a second frequency, and receiving second reflected signals from multiple scattering locations in the optical fiber; estimating a phase difference between the reflected signals, and estimating a temperature change based on the phase difference, and combining the absolute temperature and the temperature change to generate a temperature profile at a location in the borehole.

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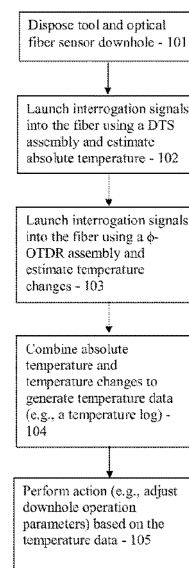


FIG. 5