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(71) Applicants (for all designated States except US):
CHEVRON U.S.A. INC. [US/US]; P.O. Box 6006, San Ramon, California 94583 (US). **LOS ALAMOS NATIONAL SECURITY LLC** [US/US]; Mail Stop A187, P.O. Box 1663, Los Alamos, New Mexico 87544 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **VU, Cung Khac** [US/US]; 2811 Lafayette Street, Houston, Texas 77005 (US). **SINHA, Dipen, N.** [US/US]; 112 Shirlane Place, Los Alamos, New Mexico 87544 (US). **PANTEA, Cristian** [RO/US]; 70 Santolina, Los Alamos, New Mexico 87544 (US). **NIHEI, Kurt, T.** [US/US]; 5839 Amy Drive, Oakland, California 94618 (US). **SCHMITT, Dennis, P.** [US/US]; 3903 S. Mason Rd. #1131, Katy, Texas 77450 (US). **SKELT, Christopher** [GB/US]; 10219 Inwood Dr., Houston, Texas 77042 (US).(74) Agents: **PEREZ, Robert, C.F.** et al.; Pillsbury Winthrop Shaw Pittman LLP, P.O. Box 10500, McLean, Virginia 22102 (US).

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(54) Title: DEVICE AND METHOD FOR GENERATING A BEAM OF ACOUSTIC ENERGY FROM A BOREHOLE, AND APPLICATIONS THEREOF

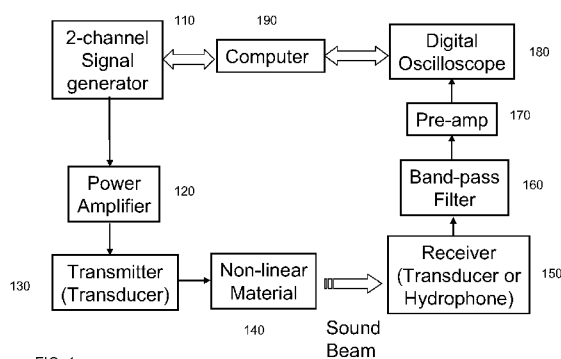


FIG. 1

(57) Abstract: In some aspects of the invention, a method of generating a beam of acoustic energy in a borehole is disclosed. The method includes generating a first broad-band acoustic pulse at a first broad-band frequency range having a first central frequency and a first bandwidth spread; generating a second broad-band acoustic pulse at a second broad-band frequency range different than the first frequency range having a second central frequency and a second bandwidth spread, wherein the first acoustic pulse and second acoustic pulse are generated by at least one transducer arranged on a tool located within the borehole; and transmitting the first and the second broad-band acoustic pulses into an acoustically non-linear medium, wherein the composition of the non-linear medium produces a collimated pulse by a non-linear mixing of the first and second acoustic pulses, wherein the collimated pulse has a frequency equal to the difference in frequencies between the first central frequency and the second central frequency and a bandwidth spread equal to the sum of the first bandwidth spread and the second bandwidth spread.