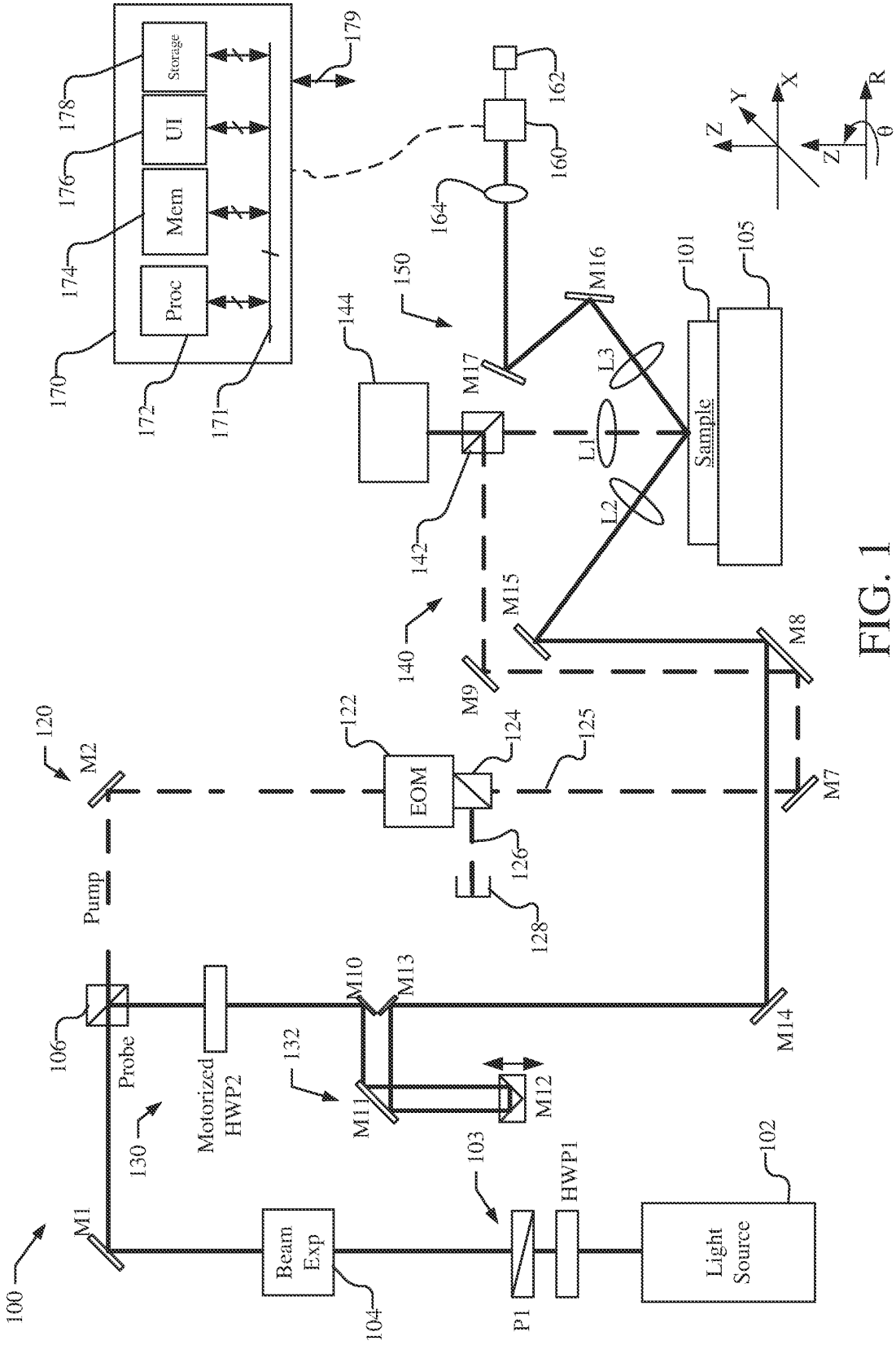

100
M1
Beam Exp
104
103
P1
HWP1
Light Source
102
130
Probe
106
Motorized HWP2
132
M11
M10
M13
M12
M14
Pump
120
M2
EOM
122
124
125
126
128
M7
M8
M9
140
M15
142
144
150
M17
M16
L1
L2
L3
Sample
101
105
160
162
164
170
172
171
Proc
Mem
UI
Storage
176
174
178
179
X
Y
Z
R
θ

FIG. 1

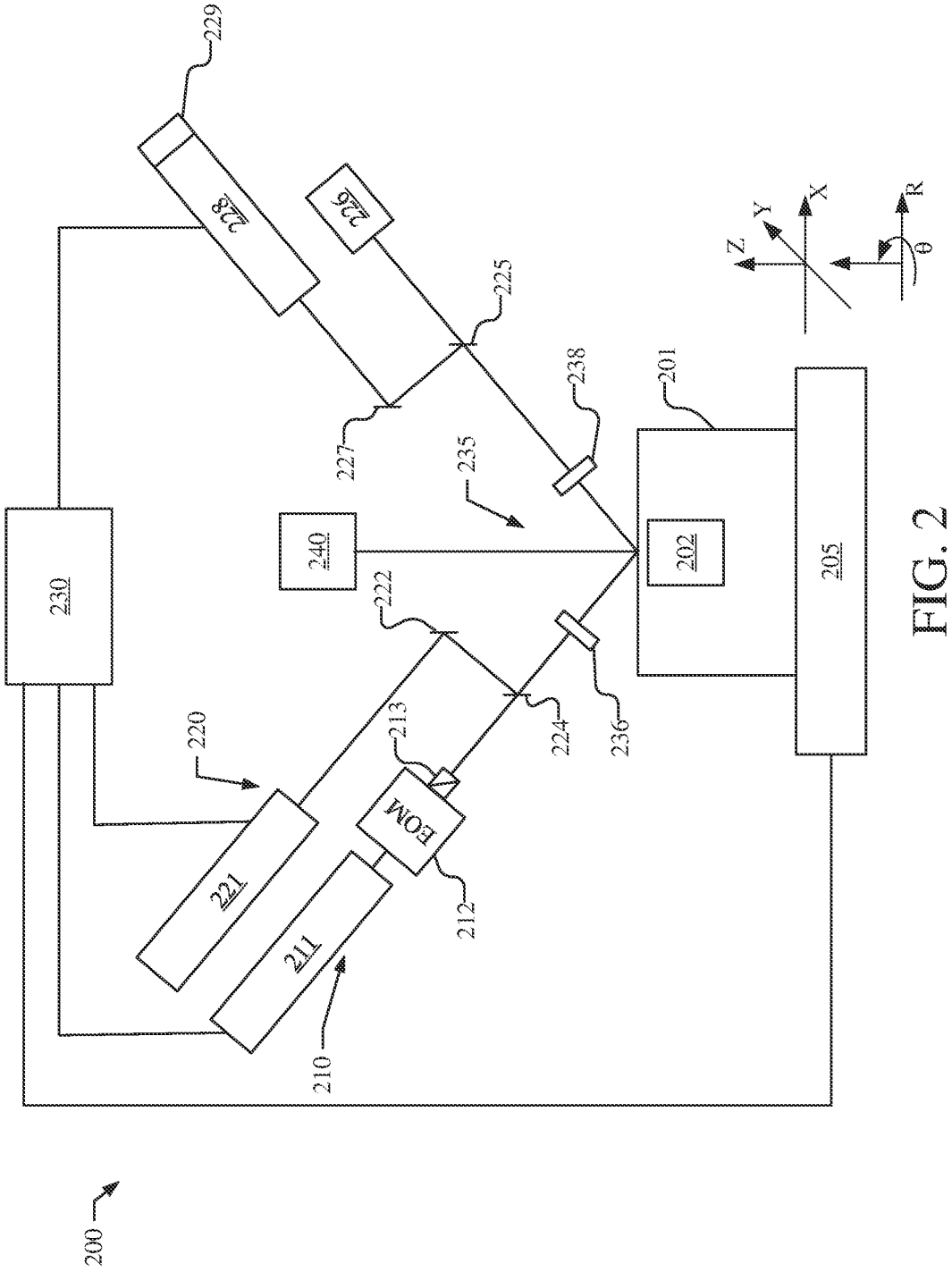

200
210
211
212
213
220
221
222
224
225
227
228
229
230
235
236
238
240
201
202
205
EOM
Z
Y
X
R
θ

FIG. 2

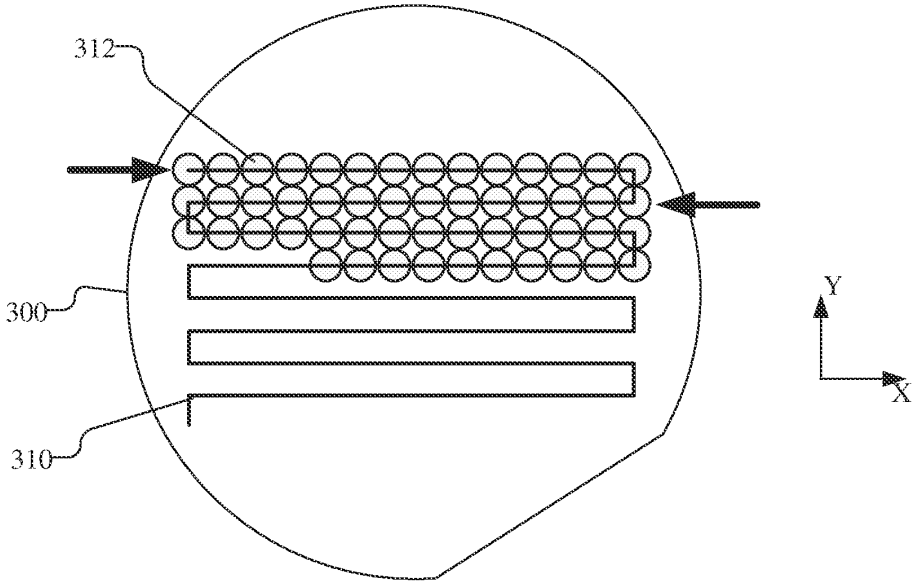


FIG. 3A

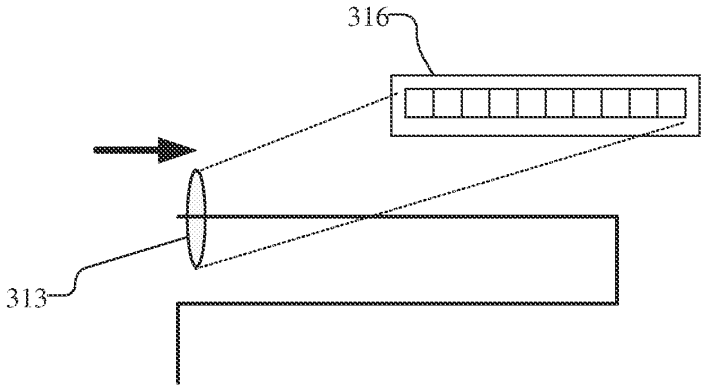


FIG. 3B

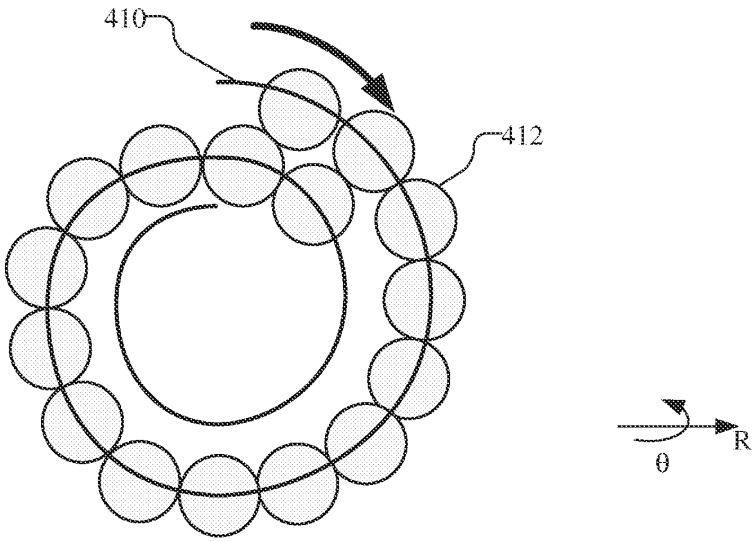


FIG. 4A

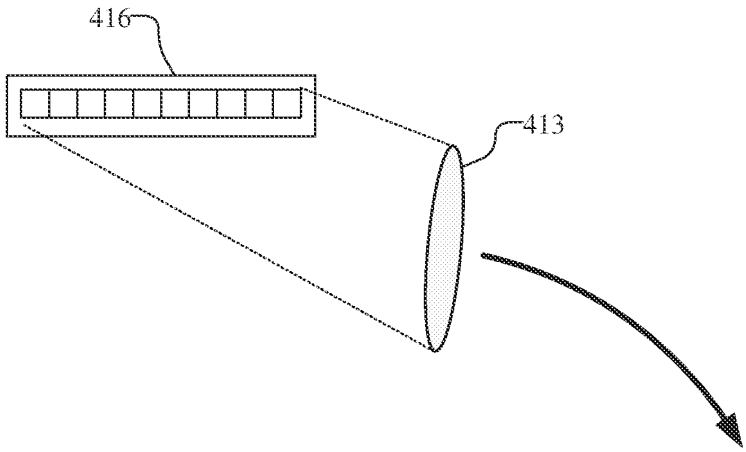


FIG. 4B

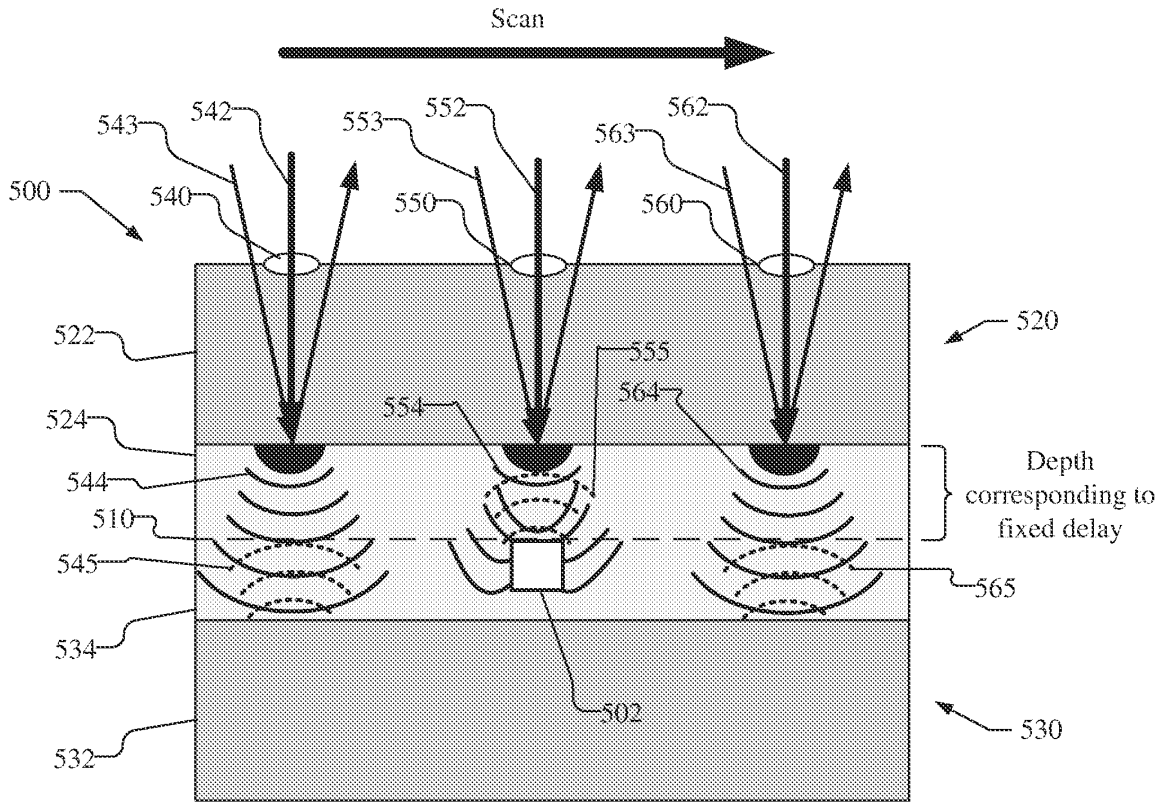

Scan
543
542
553
552
562
563
500
540
550
560
520
522
555
564
554
524
544
Depth
corresponding to
fixed delay
510
545
565
534
502
530
532

FIG. 5A

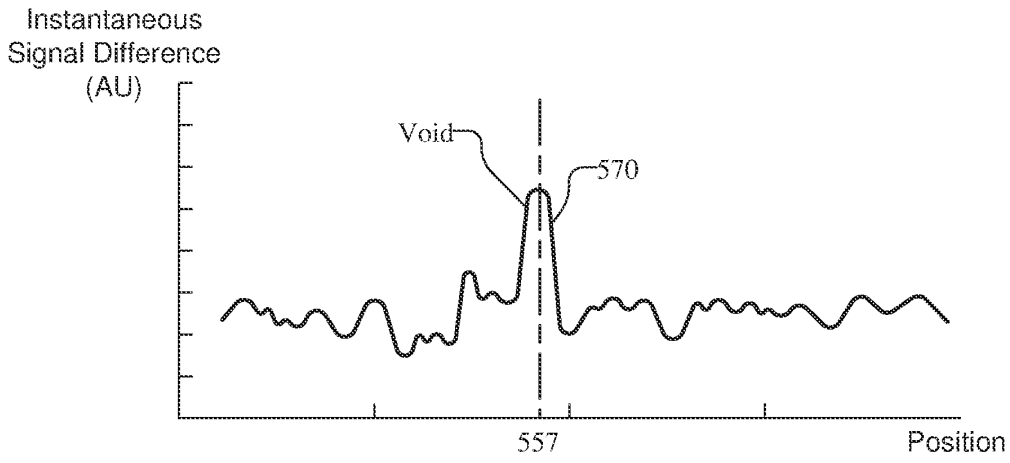

Instantaneous
Signal Difference
(AU)
Void
570
557
Position

FIG. 5B

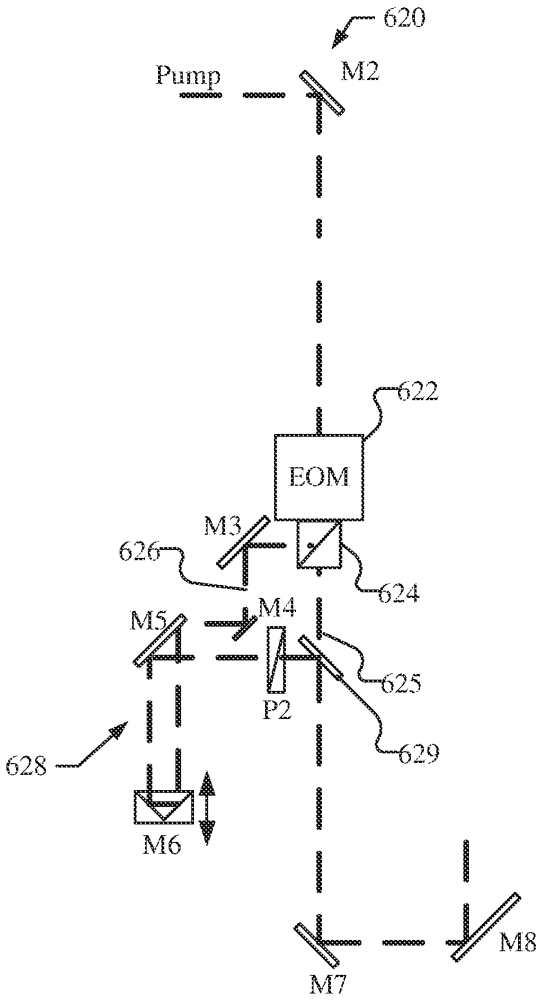


FIG. 6

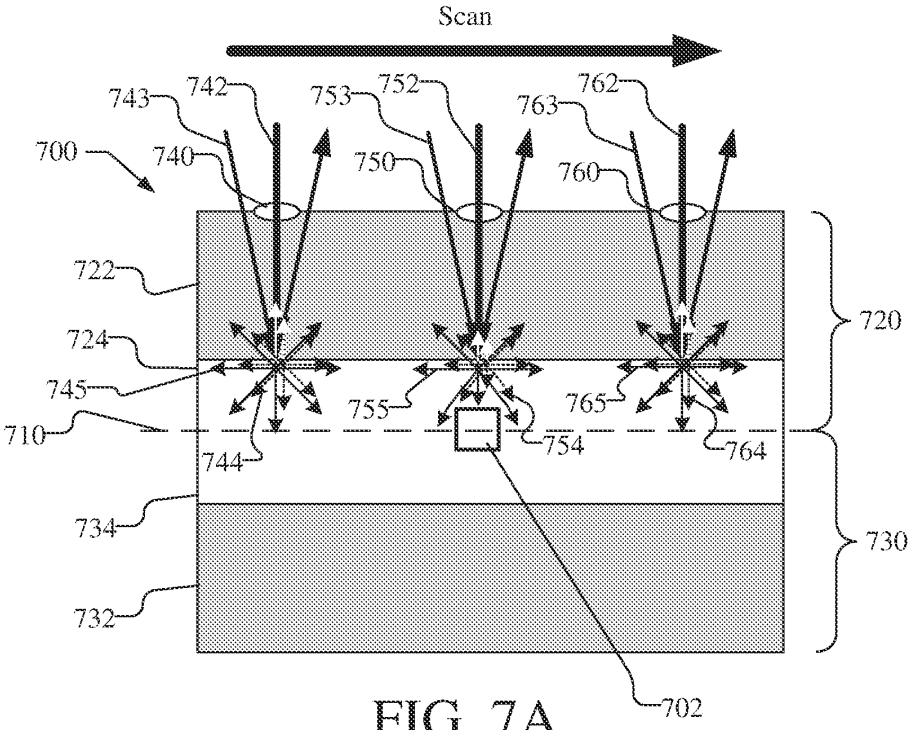


FIG. 7A

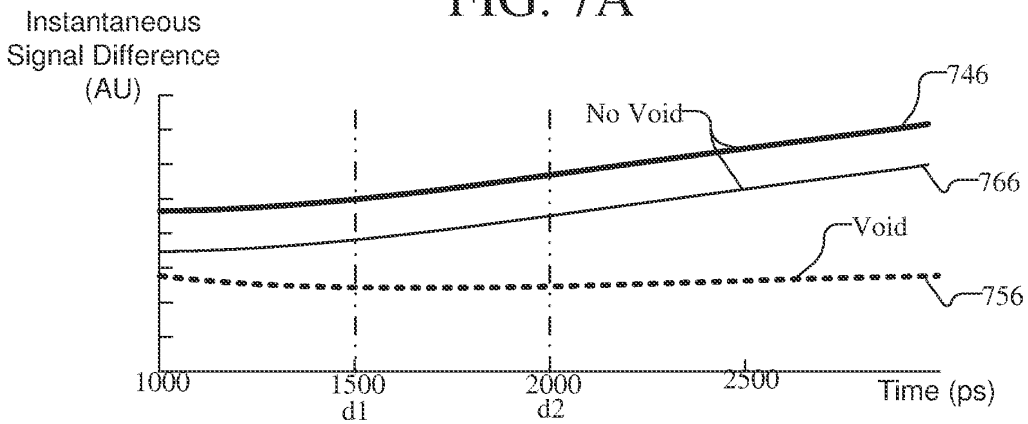


FIG. 7B

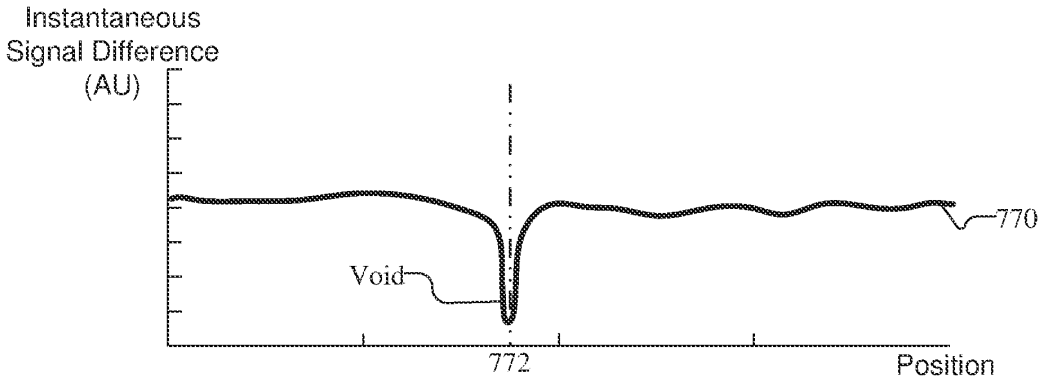


FIG. 7C

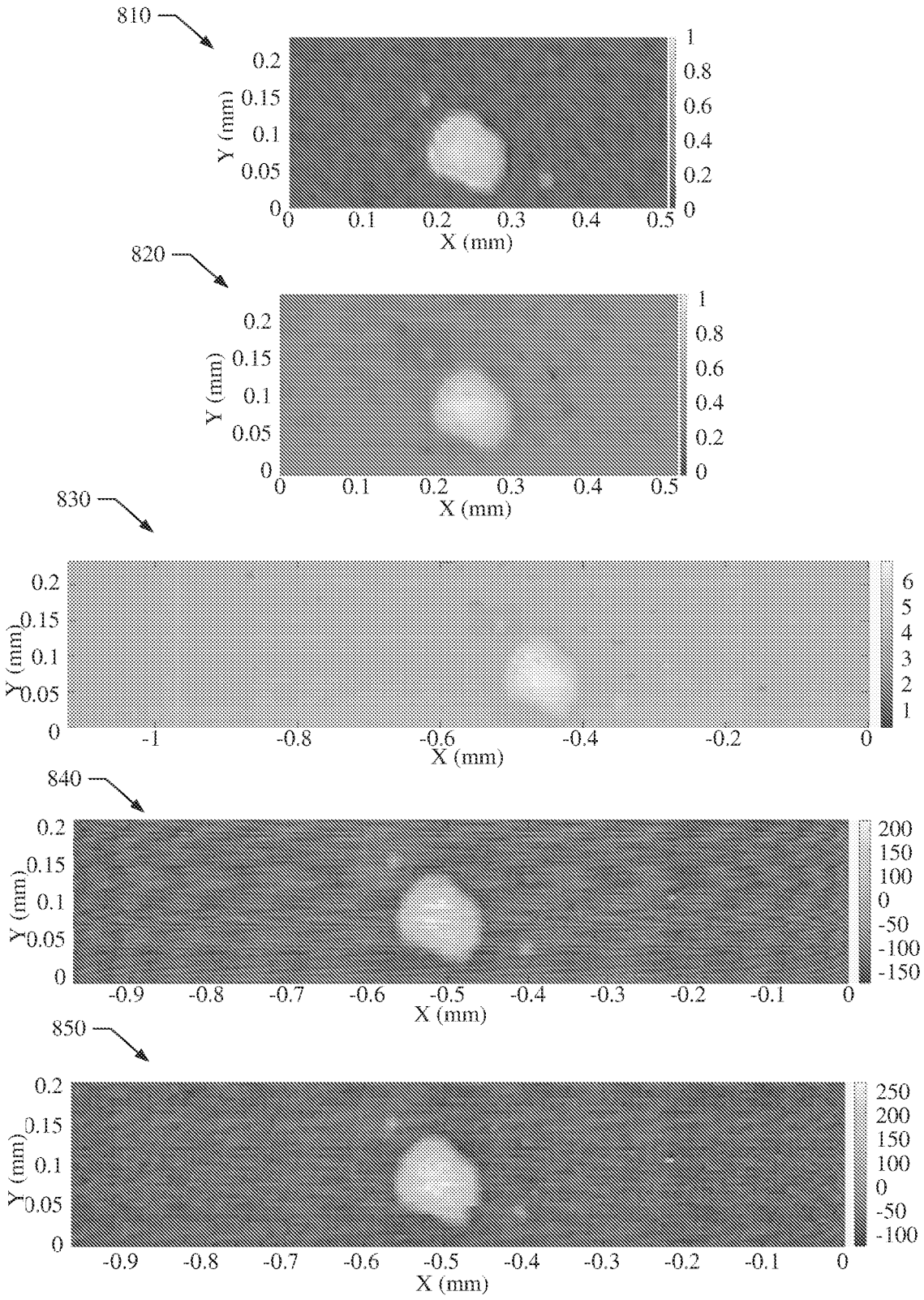


FIG. 8

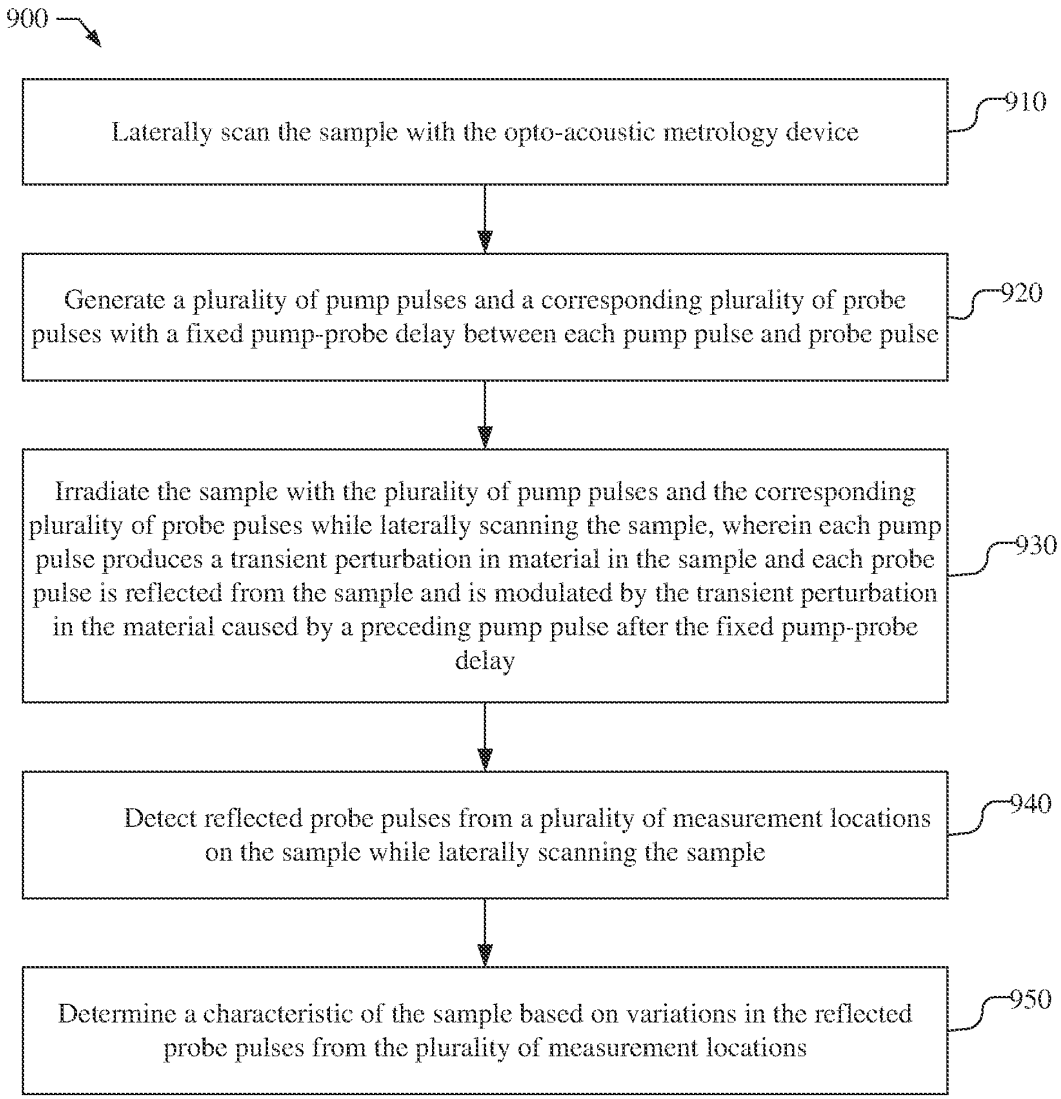

900
Laterally scan the sample with the opto-acoustic metrology device
910
Generate a plurality of pump pulses and a corresponding plurality of probe pulses with a fixed pump-probe delay between each pump pulse and probe pulse
920
Irradiate the sample with the plurality of pump pulses and the corresponding plurality of probe pulses while laterally scanning the sample, wherein each pump pulse produces a transient perturbation in material in the sample and each probe pulse is reflected from the sample and is modulated by the transient perturbation in the material caused by a preceding pump pulse after the fixed pump-probe delay
930
Detect reflected probe pulses from a plurality of measurement locations on the sample while laterally scanning the sample
940
Determine a characteristic of the sample based on variations in the reflected probe pulses from the plurality of measurement locations
950

FIG. 9