Cluster-Level Flow Mapping and Production Diagnostics Using Ultrahigh-Resolution Nanoparticle Tracers Embedded in Perforation Charges

Quan Guo
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Thursday, June 26, 2025, 9 a.m. Central Time

Dr. Quan Guo, a geomechanics advisor at QuantumPro, will speak on Thursday, June 26, 2025. The seminar will be at 9:00 Central Time. The topic is "*Cluster-Level Flow Mapping and Production Diagnostics Using Ultrahigh-Resolution Nanoparticle Tracers Embedded in Perforation Charges*".

Abstract

Dr. Guo will present QuantumPro's recent laboratory and field tests on using nanoparticle tracer embedded in perforation charges for cluster-level flow monitoring and diagnostics. Laboratory tests were performed according to API 19B standards to confirm that the tracers withstand charge detonation and to evaluate how much tracers can be embedded in charges without affecting charge performance. Two field tests on three wells were performed over a number of stages and many clusters to test longevity, consistency and repeatability of tracer detection. The first field test was performed to validate tracer detectability at field conditions after large hydraulic fracturing treatments, considering only a gram or less to a few grams of tracers per cluster. The second field test was to assess how long the tracers remain detectable or how long the cluster-level production monitoring will last. The field test results confirmed that nanoparticle tracers embedded in perforation charges can provide cluster-level production mapping for weeks and months.

Biography

Dr. QUAN GUO is a geomechanics advisor at QuantumPro, Inc. Previously, he was with SLB, M-I SWACO, Advantek, and TerraTek. His experience includes nanoparticle tracer flow monitoring and analysis, perforating and hydraulic fracturing lab testing and modeling, drilling fluids and wellbore strengthening, cuttings and produced water re-injection. He has 14 patents and authored/co-authored over 80 technical papers. He holds a Ph.D in mechanical engineering from Northwestern University.