A novel encoding mechanism for particle physics

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This study proposes a novel particle encoding mechanism that seamlessly incorporates the quantum properties of particles, with a specific emphasis on constituent quarks [1]. The primary objective of this mechanism is to facilitate the digital registration and identification of a wide range of particle information. Its design ensures easy integration with different event generators and digital simulations commonly used in high-energy experiments. Moreover, this innovative framework can be easily expanded to encode complex multi-quark states comprising up to nine valence quarks and accommodating an angular momentum of up to 99/2. This versatility and scalability make it a valuable tool.

Fig. 1 represents this encoding. The total number of digits in the particle code is N + 9. This study was inspired by discussions held within an academic conference. Current computer simulation models require more distinguishable particle codes, and more information must be included in the particle codes.

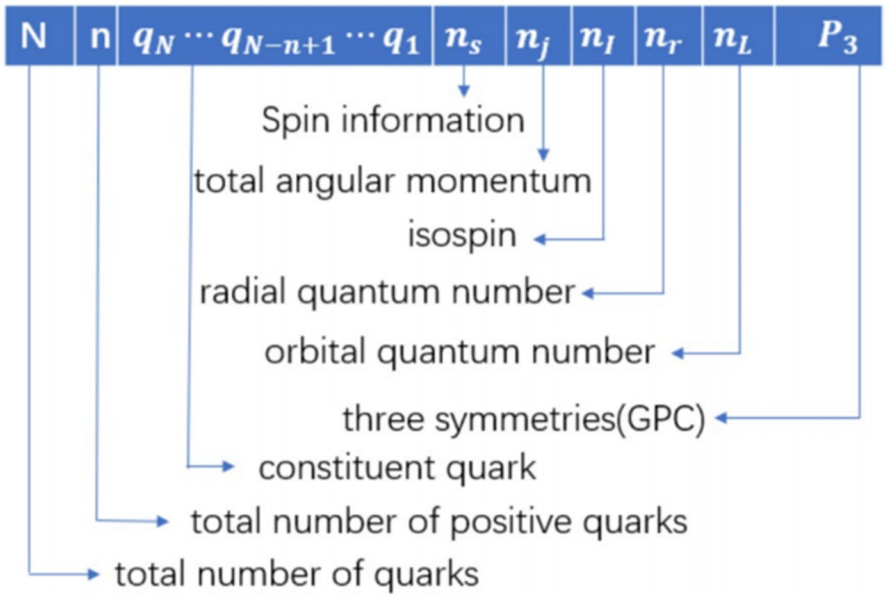

Fig. 1 (Color online) encoding diagram.

[1] Z.G. Tan, S.J. Wang, Y.N. Guo, H. Zheng, and A. Bonasera, Nucl. Sci. Tech. **35**, 144 (2024).