LUPINE PUBLISHERS

Research and Reviews on Healthcare: Open Access Journal

DOI: 10.32474/RRHOAJ.2022.07.000269

ISSN: 2637-6679

Letter to Editor

Christian Doppler Rolling Over in His Grave: The Actual Color Encoding System for Color-Doppler Ultrasonography Doesn't Preserve the Original Christian Doppler's Principles

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Received: May 30, 2022 **Published:** June 14, 2022

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In 1842 Dr. Christian Andreas Doppler published his work "Über das farbige Licht der Doppelsterne und einiger anderer Gestirne des Himmels". In his treatise Dr. Christian Doppler analyses the color of light emitted by binary star systems. A binary star system is composed of 2 stars orbiting around each other, bound by gravitational forces. A stationary star has a whitish-yellow color; conversely, in a Binary star system the star moving away from the observer emits a reddish hue light with a longer wavelength, shifting towards the infrared spectrum (redshift), while an approaching star emits a blue hue light, with a shortened wavelength, shifting toward the ultraviolet spectrum (blue-shift) [1]. With the experiments of Dr. Buys-Ballot in the early 1900s, the principles of "Doppler effect" were investigated in relation to soundwaves, leading to the development of sonar and radar equipment utilized in World War II. During the late 1950s Doppler principles began to be utilized for medical diagnostic purposes, to assess flow dynamics, giving way to the development of modern ultrasound medical devices. The initial color Doppler recordings used a "red-away, blue toward" color encoding system, but the first commercial application (by Aloka in 1985) adopted a "red toward" format. This choice was based on the concept that blod flow toward an observer was thought to represent a "warm" phenomenon, while flow directed away was seen as a "cold" phenomenon. One could also imagine this concept from the perspective of tissue perfusion, with arterial blood (red) flowing toward the tissue, and venous blood (blue) flowing away from it [2-5]. The "red toward-blue away" color Doppler encoding system have been used on echo instruments for more than 30 years. At present, changing the encoding system of color Doppler imaging would certainly be inconvenient. We think, however, that this little notion should be part of the cultural background of each instrumentalist: you cannot build future without memory of the past..

References

1. Doppler CJ (1842) Uber da farbige Licht der Doppelsterne Anhandlunen der Königlishen Böhmischen Gesellschaft der Wissenchafter 11: 465.
2. Franklin DL, VanCitters RL, Watson NW (1965) Applications of telemetry to measurement of blood flow and pressure in unrestrained animals. Proceedings of the National Telemetry Conference 233–234.
3. Baker DW, Watkins DW (1967) A phase coherent pulsed Doppler system for cardiovascular measurement. Proc 20th ACEMB 27: p.2.
4. Rushmer RF, Baker DW, Johnson WL, Strandness DE (1967) Clinical applications of a transcutaneous ultrasonic flow detector. JAMA 199: 104–106.
5. Martinoli C, Pretolesi F, Crespi G, Bianchi S, Gandolfo N (1998) Power Doppler sonography: clinical applications. Eur J Radiol27 Suppl 2: 133-140.

DOI: 10.32474/RRHOAJ.2022.07.000269