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Time-Resolved Imaging of a Pulsed DC Magnetron Plasma During the Sputter Deposition of TiO_2 Films ABE BELKIND, KURT BECKER, JOSE LOPEZ, Stevens Institute of Technology, SHANMUGAMURTHY SHANMUGAMURTHY, WEIDONG ZHU TEAM[1], GUY BUYLE TEAM[2] — Time resolved images from a pulsed DC titanium target magnetron plasma were taken with a Roper Scientific ICCD camera. The camera was exposed to the discharge for 0.05-0.2 μs with 0.05-0.2 μs separation between each exposure. At the beginning of the *on-time* when the power is turned on, the discharge initially starts preferentially in the cross corners of the *race track*. During the rest of the *on-time*, the emission from the straight sections of the *race track* of the magnetron is always slightly stronger than the emission from the two rounded corners of the *race track*. This pattern extends into the start of the *off-time* when the power is turned off. The optical emissions persist for several microseconds into the *off-time*. Spectral filters were used in order to record the temporal behavior of the emissions from various species (Ar, O). The observed "corner effect" at the beginning of the *on time* was modeled using a Monte Carlo method by retracing the high energy electrons. Work supported by the U.S. National Science Foundation and the U.S. Army.

[1]Center for Bioelectrics, Old Dominion University
[2]Ghent University, Ghent, Belgium

Abe Belkind
Stevens Institute of Technology

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