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Identity development in upper-level physics students: transitions in and out of physics

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In this era of unprecedented attention from the White House and Congress, the STEM community must rise to the challenge of recruiting and retaining students to achieve the mandate of producing one million additional college graduates with degrees in STEM. However, the number of students choosing to pursue and persist with physics as a degree has had a stagnated growth rate when compared to other STEM fields, and some institutions are experiencing dramatic shifts in the demographics of the students entering their programs. The development of a subject-specific identity is a strong influence on students' persistence in a discipline and is a productive lens from which to understand the stagnated growth rate of physics majors and how to support a shift in student demographics. In this presentation, ongoing research is presented that aims to understand identity development in STEM with a focus on the transition from physics student to physicist. Community development and exposure to authentic practice are established as crucial factors that contribute to the development of a professional identity. How these findings can be implemented into course design is discussed with an outline of the P³ learning environment. The P³ learning environment blends the regular focus of reform-based teaching practices on deep conceptual understanding with a focus on students obtaining understanding through engagement with authentic scientific practices. By establishing and studying learning environments similar to P³ we can further explore the development of subject-specific identity while also developing effective teaching practices.