

外国人客員所員を経験して

Mario Novak

Faculty of Science, University of Zagreb, Croatia

mnovak@phy.hr

As a visiting professor, I stayed at ISSP, the Hiroi lab, for seven months, from September 2017 until April 2018. During my stay, I worked on several different materials belonging to the group on novel three-dimensional Dirac semimetals. My focus was put on transport properties of nodal-line Dirac semimetals where I performed material synthesis and low-temperature transport measurements. Transport measurements were performed in the Hiroi lab and also in collaboration with the Osada lab where we measured angular dependence of the magnetoresistance.

I am very grateful to Osada-sensei, for recognizing interesting points of my research and allowing me to use their sophisticated equipment. In addition, I am thankful to Uchida-san and Sato-san for helping me during the measurements. Using these angular magnetoresistance measurements, we were able to obtain new information on the shape of the Fermi surface, which is very important for understanding the transport properties of the particular Dirac semimetal. Moreover, I have used magnetic susceptibility measurements to get information of the Fermi surface by the quantum oscillations. Combing the data from several different methods gave us enough information to gain a better understanding of the material properties.

Besides doing research on nodal-line Dirac semimetals, which was an extension of my work started in Zagreb, I spent time trying to synthesize some new materials which have interesting theoretically predicted properties but have not yet been realized in the form of single crystals. At ISSP, I was able to try many different methods and paved the way for future work on this topic back in Zagreb. My stay at ISSP was very fruitful thanks to excellent working environment and top experimental

equipments. I managed to do many important measurements in a really short time.

I came to Kashiwa with my family (wife and daughter), and we had fascinating time traveling around Tokyo area and visiting many places and especially enjoying Japanese food.

Finally, I would like to express my sincere gratitude to Hiroi-sensei who gave me this opportunity to stay at ISSP and to do interesting and independent research in the field of the topological materials. Also, I have to emphasize immense help of group assistant professors Hirai-san and Yajima-san, and Ph.D. students Okuma-kun, Ishii-kun, and Matsubayashi-kun and Rieko-san who assisted me through many material syntheses. Finally, my special thanks go to Yoshida-san, Ishiguchi-san and Hashiguchi-san whose tremendous care and kind intentions helped me so that my stay become as smooth as possible.

I could not have wished for a more beautiful end of my stay at ISSP. At the end of the stay my family and I went to a beautiful Hanami party at Kashiwanoha koen where we enjoyed in a nice food and company of Hiroi-sensei lab members.

I hope that in the future I will have a chance to visit ISSP many more times.

Kind regards,

MARIO NOVAK

