

REFEREED
SCIENTIFIC
JOURNALS

Varglund, I., **Järvelä, E.**^a, Hardcastle, M. J. and 2 coauthors. A comprehensive radio study of narrow-line Seyfert 1 galaxies. Submitted for publication in *Astronomy & Astrophysics*, 2024.

Buhariwalla, M. Z., Gallo, L. C., Mao, J. ... **Järvelä, E.** and 4 coauthors. A Hot Mess: The Rich and Complex Soft Emitting Regions Surrounding the Reflection Dominated Flaring Central Engine of Mrk 1239. Accepted for publication in *The Astrophysical Journal*, 2024.

Vietri, A., Berton, M., **Järvelä, E.**^a and 5 coauthors. The host galaxy of low-luminosity compact sources. Accepted for publication in *Astronomy & Astrophysics*, 2024.

Järvelä, E., Savolainen, T., Berton, M. and 9 coauthors. Unprecedented extreme high-frequency radio variability in early-stage active galactic nuclei. Submitted for publication in *Monthly Notices of the Royal Astronomical Society*, arXiv:2312.02326, 2023.

Foschini, L., Dalla Barba, B., Tornikoski, M. ... **Järvelä, E.** and 5 coauthors. The power of relativistic jets: a comparative study. *Universe*, 10:156, 2024.

Chen S., Kharb, P., Silpa S., ... **Järvelä, E.** and 10 coauthors. A large jet narrow-line Seyfert 1 galaxy: observations from parsec to 100 kpc scales. *The Astrophysical Journal*, 963:32, 2024.

Ojha, V., Singh, V., Berton, M., and **Järvelä, E.** Intra-night optical variability of peculiar narrow-line Seyfert 1 galaxies with enigmatic jet behavior. *Monthly Notices of the Royal Astronomical Society*, 529:108, 2023.

Varglund, I., **Järvelä, E.**^a, Ciroi, S. and 3 coauthors. A host galaxy study of southern narrow-line Seyfert 1 galaxies. *Astronomy & Astrophysics*, 679:32, 2023.

Romano, P., Lähteenmäki, A., Vercellone, S. ... **Järvelä, E.** and 9 coauthors. Long-term *Swift* and Metsähovi monitoring of SDSS J164100.10+345452.7 reveals multi-wavelength correlated variability. *Astronomy & Astrophysics*, 673:85, 2023.

Foschini, L., Lister, M. L., Andernach, H. ... **Järvelä, E.** and 10 coauthors. A New Sample of Gamma-Ray Emitting Jetted Active Galactic Nuclei. *Universe*, 8:587, 2022.

Varglund, I., **Järvelä, E.**^a, Lähteenmäki, A., and 3 coauthors. Jetted narrow-line Seyfert 1 galaxies breaking the jet paradigm – a comprehensive study of host galaxy morphologies. *Astronomy & Astrophysics*, 668:91, 2022.

Vietri, A., **Järvelä, E.**^a, Berton, M., and 4 coauthors. Spectacular 240 kpc double-sided relativistic jets in a spiral-hosted narrow-line Seyfert 1 galaxy. *Astronomy & Astrophysics*, 662:20, 2022.

Chen, S., Stevens, J. B., Edwards, P. G., ... **Järvelä, E.** and 6 coauthors. Radio spectra of narrow-line Seyfert 1 galaxies with ATCA and VLASS. *Monthly Notices of the Royal Astronomical Society*, 512:471, 2022.

Järvelä, E., Dahale, R., Crepaldi, L., and 3 coauthors. Unravelling the origin of extended radio emission in narrow-line Seyfert 1 galaxies with the JVLA. *Astronomy & Astrophysics*, 658:12, 2022.

^a PhD thesis advisor of the first author.

Kim, S.-H., Lee, S.-S., Lee, J. W. ... **Järvelä, E.** and 14 coauthors. Magnetic Field Strengths of the Synchrotron Self-Absorption Region in the Jet of CTA 102 During Radio Flares. *Monthly Notices of the Royal Astronomical Society*, 510:815, 2022.

MAGIC Collaboration; Acciari, V. A., Ansoldi, S., Antonelli, L. A. ... **Järvelä, E.** and 284 coauthors. Investigation of the correlation patterns and the Compton dominance variability of Mrk 421 in 2017. *Astronomy & Astrophysics*, 655:89, 2021.

Berton, M., Pelusco, G., Marziani, P. ... **Järvelä, E.** and 18 coauthors. Hunting the nature of the enigmatic narrow-line Seyfert 1 galaxy PKS 2004-447. *Astronomy & Astrophysics*, 654:125, 2021.

Foschini, L., Lister, M., Antón, S. ... **Järvelä, E.** and 6 coauthors. A new sample of gamma-ray emitting jetted active galactic nuclei - Preliminary results. *Universe*, 7:372, 2021.

Järvelä, E., Berton, M. and Crepaldi, L. Narrow-line Seyfert 1 galaxies with absorbed jets – insights from radio spectral index maps. *Frontiers in Astronomy and Space Sciences*, 8:147, 2021.

Hamilton, T. S., Berton, M., Antón, S. ... **Järvelä, E.** and 8 coauthors. Observations of the gamma-ray emitting narrow-line Seyfert 1, SBS 0846+513, and its host galaxy. *Monthly Notices of the Royal Astronomical Society*, 504:5188, 2021.

Berton, M. and **Järvelä, E.**^c Jet-Induced Feedback in the [O III] Lines of Early Evolution Stage Active Galactic Nuclei. *Universe*, 7:188, 2021

Acciari, V. A., Ansoldi, S., Antonelli, L. A. ... **Järvelä, E.** and 221 coauthors. Multiwavelength variability and correlation studies of Mrk 421 during historically low X-ray and γ -ray activity in 2015-2016. *Monthly Notices of the Royal Astronomical Society*, 504:1427, 2021.

Egion, E., Pellizzoni, A., Righini, S. ... **Järvelä, E.** and 15 coauthors. Investigating the mini and giant radio flare episodes of Cygnus X-3. *The Astrophysical Journal*, 906:10, 2020.

Congiu, E., Kharb, P., Tarchi, A., ... **Järvelä, E.** and 8 coauthors. The radio structure of the narrow-line Seyfert 1 Mrk 783 with VLBA and e-MERLIN. *Monthly Notices of the Royal Astronomical Society*, 499:3149, 2020.

Chen, S., **Järvelä, E.**, Crepaldi, L. and 8 coauthors. Radio morphology of southern narrow-line Seyfert 1 galaxies with Very Large Array observations. *Monthly Notices of the Royal Astronomical Society*, 498:1278, 2020.

Järvelä, E., Berton, M., Ciroi, S. and 3 coauthors. SDSS J211852.96-073227.5: The first non-local, interacting, late-type intermediate Seyfert galaxy with relativistic jets. *Astronomy & Astrophysics*, 636:12, 2020.

Berton, M., **Järvelä, E.**^c, Crepaldi, L. and 6 coauthors. Absorbed relativistic jets in radio-quiet narrow-line Seyfert 1 galaxies. *Astronomy & Astrophysics*, 636:64, 2020.

Volvach, A. E., Volvach, L. N., Larionov, M. G. ... **Järvelä, E.** and 6 coauthors. Flare Activity of Blazar AO 0235+164. *Cosmic Research*, 57:85, 2019.

Berton, M., Congiu, E., Ciroi, S. ... **Järvelä, E.** and 14 coauthors. The interacting late-type host galaxy of the radio-loud narrow-line Seyfert 1 IRAS 20181-2244. *Astronomical Journal*, 157:48,

^c Corresponding author, when not the first author.

2019.

Vercellone, S., Romano, P., Piano, G., ... **Järvelä, E.** and 55 coauthors. AGILE, Fermi, Swift, and GASP/WEBT multi-wavelength observations of the high-redshift blazar 4C +71.07 in outburst. *Astronomy & Astrophysics*, 621:82, 2019.

MAGIC Collaboration; Ahnen, M. L., Ansoldi, S., Antonelli, L. A. ... **Järvelä, E.** and 187 coauthors. Multi-wavelength characterization of the blazar S5 0716+714 during an unprecedented outburst phase. *Astronomy & Astrophysics*, 619:45, 2018.

Järvelä, E., Lähteenmäki, A. and Berton M. Near-infrared morphologies of the host galaxies of narrow-line Seyfert 1 galaxies. *Astronomy & Astrophysics*, 619:69, 2018.

Bychkova, V. S., Volvach, A. E., Volvach, L. N. ... **Järvelä, E.** and 10 coauthors. Characteristics of the Flare Phenomenon in Blazar AO0235+164 in Gamma, Optical, and Radio Bands. *Astrophysical Bulletin*, 73:293, 2018.

MAGIC Collaboration; Ahnen, M. L., Ansoldi, S., Antonelli, L. A. ... **Järvelä, E.** and 167 coauthors. The detection of the blazar S4 0954+65 at very-high-energy with the MAGIC telescopes during an exceptionally high optical state. *Astronomy & Astrophysics*, 617:30, 2018.

Berton, M., Liao, N. H., La Mura, G., **Järvelä, E.** and 16 coauthors. The FSRQ 3C 345 from the high to the low emission state. *Astronomy & Astrophysics*, 614:148, 2018.

Berton, M., Congiu, E., **Järvelä, E.** and 14 coauthors. Radio-emitting narrow-line Seyfert 1 galaxies in the JVLA perspective. *Astronomy & Astrophysics*, 614:87, 2018.

Lähteenmäki, A., **Järvelä, E.**, Ramakrishnan, V. and 4 coauthors. Radio jets and gamma-ray emission in radio-silent narrow-line Seyfert 1 galaxies. *Astronomy & Astrophysics*, 614:1, 2018.

Kidger, M., Zola, S., Valtonen, M. ... **Järvelä, E.** and 5 coauthors. Far-infrared photometry of OJ 287 with the Herschel Space Observatory. *Astronomy & Astrophysics*, 610:74, 2018.

Gabányi, K. É., Frey, S., Paragi, Z., **Järvelä, E.** and 4 coauthors. The radio structure of the peculiar narrow-line Seyfert 1 galaxy candidate J1100+4421. *Monthly Notices of Royal Astronomical Society*, 473:1554, 2018.

Aria, S., Azevedo, R., Burow, R. ... **Järvelä, E.** and 11 coauthors. GLINT - Gravitational-wave Laser Interferometry Triangle. *Experimental Astronomy*, 44:181, 2017.

Järvelä, E., Lähteenmäki, A., Lietzen, H. and 3 coauthors. Large-scale environments of narrow-line Seyfert 1 galaxies. *Astronomy & Astrophysics*, 606:9, 2017.

Lähteenmäki, A., **Järvelä, E.**, Hovatta, T. and 12 coauthors. 37GHz observations of narrow-line Seyfert 1 galaxies. *Astronomy & Astrophysics*, 603:100, 2017.

Congiu, E., Berton, M., Giroletti, M. ... **Järvelä, E.** and 11 coauthors. Kiloparsec-scale emission in the narrow-line Seyfert 1 galaxy Mrk 783. *Astronomy & Astrophysics*, 603:32, 2017.

MAGIC Collaboration; Ahnen, M. L., Ansoldi, S., Antonelli, L. A. ... **Järvelä, E.** and 170 coauthors. Multiwavelength observations of a VHE gamma-ray flare from PKS 1510-089 in 2015. *Astronomy & Astrophysics*, 603:29, 2017.

Pallister, S., Coop, S., Formichella, V. ... **Järvelä, E.** and 11 coauthors. A blueprint for a

simultaneous test of quantum mechanics and general relativity in a space-based quantum optics experiment. *EPJ Quantum Technology*, 4:2, 2017.

Planck Collaboration: Ade, P. A. R., Aghanim, N., Allert, H.D. ... **Järvelä, E.** and 182 coauthors. Planck intermediate results. XLV. Radio spectra of northern extragalactic radio sources. *Astronomy & Astrophysics*, 596:106, 2016.

Foschini, L., Berton, M., Caccianiga, A. ... **Järvelä, E.** and 26 coauthors. Properties of flat-spectrum radio-loud Narrow-Line Seyfert 1 Galaxies. *Astronomy & Astrophysics*, 575:13, 2015.

Järvelä, E., Lähteenmäki, A. and León-Tavares, J. Statistical multifrequency study of Narrow-Line Seyfert 1 galaxies. *Astronomy & Astrophysics*, 573:76, 2015.

Ramakrishnan, V., León-Tavares, J., Rastorgueva-Foi, E. A. ... **Järvelä, E.** and 28 coauthors. The connection between the parsec-scale radio jet and gamma-ray flares in the blazar 1156+295. *Monthly Notices of Royal Astronomical Society*, 445:1636-1646, 2014.

Vol'vach, A. E., Kutkin, A. M., Larionov, M. G., ... **Järvelä, E.** and 7 coauthors. A prolonged flare in the blazar 3C 454.3. *Astronomy Reports*, 57:46-51, 2013.

Arlen, T., Aune, T., Beilicke, M. ... **Järvelä, E.** and 83 coauthors. Rapid TeV Gamma-Ray Flaring of BL Lacertae. *The Astrophysical Journal*, 762:92, 2013.

Aleksić, J., Alvarez, E. A., Antonelli, L. A. ... **Järvelä, E.** and 163 coauthors. Discovery of VHE γ -rays from the blazar 1ES 1215+303 with the MAGIC telescopes and simultaneous multi-wavelength observations. *Astronomy & Astrophysics*, 544:142, 2012.

Kallunki, J., Lavonen, N., **Järvelä, E.**, Uunila, M. A Study of Long-Term Solar Activity at 37 GHz. *Baltic Astronomy*, 21:255-262, 2012.

REFEREED
CONFERENCE
PROCEEDINGS

Berton, M. and **Järvelä, E.**^c Peaked sources and narrow-line Seyfert 1s: a love story. *Astronomische Nachrichten*, 342:1066, 2021, as part of the *Proceedings of the 6th Workshop on CSS and GPS Radio Sources*, Toruń, Poland, May 10-14, 2021.

Berton, M., Björklund, I., Lähteenmäki, A. ... **Järvelä, E.** and 3 coauthors. Line shapes in narrow-line Seyfert 1 galaxies: a tracer of physical properties? *Proceedings of "12th Serbian Conference on Spectral Line Shapes in Astrophysics"*, Vrdnik, Serbia, June 3-7, 2019.

Järvelä, E., Lähteenmäki, A. and Lietzen, H. Large-scale environment properties of narrow-line Seyfert 1 galaxies at $z < 0.4$. *Proceedings of "Quasars at all cosmic epochs"*, Padova, Italy, April 2-7, 2017.

CONFERENCE
PROCEEDINGS

The MAGIC Collaboration, The FACT Collaboration, The Fermi-LAT Collaboration ... **Järvelä, E.** and 227 coauthors. Multiwavelength variability and correlation studies of Mrk 421 during historically low X-ray and γ -ray activity in 2015-2016. *Proceedings of "37th International Cosmic Ray Conference"*, Berlin, Germany - Online, July 12-23, 2021.

Arbet-Engels, A., Paneque, D., Heckmann, L. ... **Järvelä, E.** and 222 coauthors. Unveiling the complex correlation patterns in Mrk 421. *Proceedings of "37th International Cosmic Ray Conference"*, Berlin, Germany - Online, July 12-23, 2021.

Järvelä, E., Lähteenmäki, A. and Berton, M. Host galaxies of jetted narrow-line Seyfert 1 galaxies. *Proceedings of "Revisiting narrow-line Seyfert 1 galaxies and their place in the Universe"*,

Padova, Italy, April 9-13, 2018.

Järvelä, E. and Lähteenmäki, A. Narrow-line Seyfert 1 galaxies - rebels of the AGN family. *Proceedings of the “28th Texas Symposium on Relativistic Astrophysics”*, Geneva, Switzerland, December 13-18, 2015.

Foschini, L., Berton, M., Caccianiga, A. ... **Järvelä, E.** and 26 coauthors. Broad-band properties of flat-spectrum radio-loud narrow-line Seyfert 1 galaxies. *Proceedings of the “28th Texas Symposium on Relativistic Astrophysics”*, Geneva, Switzerland, December 13-18, 2015.

Foschini, L., Berton, M., Caccianiga, A. ... **Järvelä, E.** and 26 coauthors. Multiwavelength survey of a sample of flat-spectrum radio-loud narrow-line Seyfert 1 galaxies. *Proceedings of the “High Energy Phenomena in Relativistic Outflows V (HEPRO V)”*, La Plata, Argentina, October 5-8, 2015.

Ramakrishnan, V., León-Tavares, J., Rastorgueva-Foi, E. A. ... **Järvelä, E.** and 29 coauthors. Connection between parsec-scale radio jet and gamma-ray flares in the blazar 1156+295. *Proceedings of the “12th European VLBI Network Symposium and Users Meeting (EVN 2014)”*, Cagliari, Italy, October 7-10, 2014.

OTHER
PUBLICATIONS

Romano, P., Vercellone, S., Foschini, L., Berton, M., and **Järvelä, E.**. Swift observations of SDSS J102906.69+555625.2 and SDSSJ152205.41+393441.3. *The Astronomer’s Telegram*, 16031:1, 2023.

INVITED SEMINARS
AND COLLOQUIA

Järvelä, E. Extreme high radio frequency variability in early-stage AGN. Astrophysics Seminar, Purdue University, January 22, 2024.

Järvelä, E. Unprecedented extreme high-frequency radio variability in early-stage active galactic nuclei. CMB-S4 Sources and transient working group meeting, online, October 18, 2023

Järvelä, E. Enigmatic radio nature of narrow-line Seyfert 1 galaxies. Aalto University Metsähovi Radio Observatory, Kylmälä, Finland, November 25, 2022.

Järvelä, E. Diverse and puzzling radio nature of narrow-line Seyfert 1 galaxies. Max Planck Institute for Radio Astronomy, Bonn, Germany, November 8, 2022.

Järvelä, E. Narrow-line Seyfert 1 galaxies - the puzzling young rebels. IRAM Granada, Spain, June 17, 2022.

Järvelä, E. Narrow-line Seyfert 1 galaxies - young rebels of the AGN family. St. Mary’s University, Halifax, NS, Canada, September 13, 2019.

Järvelä, E. Multivariable studies of narrow-line Seyfert 1 galaxies. Brera Astronomical Observatory, Merate, Italy, May 10, 2016.

INTERNATIONAL
MEETINGS AND
CONFERENCES

Järvelä, E.. Invited review talk: Active galactic nuclei in radio. The Santiago AGN workshop: a holistic view of active galaxies, ESO, Santiago de Chile, Chile, November 20-22, 2023.

Järvelä, E., Savolainen, T., Berton, M., et al. Poster: Early-stage active galactic nuclei with extreme radio variability. The restless nature of AGN: 10 years later, Naples, Italy, June 26-30, 2023.

Järvelä, E., Savolainen, T., Berton, M., et al. Poster: Extreme radio variability in early-stage

active galactic nuclei. New eyes on the Universe: SKA and ngVLA, Vancouver, Canada, May 1-5, 2023.

Järvelä, E., Berton, M., Savolainen, T. et al. Contributed talk: Extreme radio variability in narrow-line Seyfert 1 galaxies. Panchromatic view of the life-cycle of AGN, ESA - ESAC, Madrid, Spain, September 14-16, 2022.

Järvelä, E., Dahale, R., Crepaldi, L. et al. Contributed talk: Extended radio emission in narrow-line Seyfert 1 galaxies. Growing black holes: accretion and mergers, Kathmandu, Nepal, May 15-20, 2022.

Järvelä, E., Lähteenmäki A. and Berton M. Contributed talk: Hosts of jetted narrow-line Seyfert 1 galaxies in NIR. IAU Symposium 356: Nuclear Activity in Galaxies across Cosmic Time, Addis Abeba, Ethiopia, October 7-11, 2019.

Järvelä, E., Lähteenmäki A. and Berton M. Contributed talk: Host galaxies of jetted narrow-line Seyfert 1 galaxies in near-infrared. The large scale properties of the universe as a whole, Tuorla-Tartu meeting, Science Centre Tuorla, Piikkiö, Finland, October 3-5, 2018.

Järvelä, E., Lähteenmäki A. and Berton M. Contributed talk: Host galaxy morphologies of jetted narrow-line Seyfert 1 galaxies, Finnish-Russian Radio Astronomy Symposium, Science Centre Tuorla, Piikkiö, Finland, September 5-7, 2018.

Järvelä, E., Lähteenmäki A. and Berton M. Contributed talk: Host galaxies of jetted narrow-line Seyfert 1 galaxies, Revisiting narrow-line Seyfert 1 galaxies and their place in the Universe, Padova, Italy, April, 9-13, 2018.

Järvelä, E. Invited talk: Large-scale environment - a new perspective on narrow-line Seyfert 1 galaxies, Young Astronomers on Galactic Nuclei, Teruel, Spain, October 23-25, 2017.

Järvelä, E. Contributed talk: Large-scale environment properties of narrow-line Seyfert 1 galaxies, What matters?, Tartu-Tuorla meeting, Tõrve, Estonia, September 27-29, 2017.

Järvelä, E. Contributed talk: Large-scale environments of narrow-line Seyfert 1 galaxies, Quasars at all cosmic epochs, Padova, Italy, April 2-7, 2017.

Järvelä, E. Contributed talk: Holistic view of narrow-line Seyfert 1 galaxies, Building blocks of the Universe, Tartu-Tuorla meeting, Tuorla Observatory, Piikkiö, Finland, September 28-30, 2016.

Järvelä, E. Contributed talk: Holistic view of young active galactic nuclei - the case of narrow-line Seyfert 1 galaxies, Active Galactic Nuclei - What's in a name?, ESO Headquarters, Garching, Germany, June 27 - July 1, 2016.

Järvelä, E. and Lähteenmäki A. Poster: Narrow-line Seyfert 1 galaxies: the perplexing jetted spirals, Blazars through sharp Multi-wavelength eyes, Málaga, May 30 - June 3, 2016.

Järvelä, E. Contributed talk: Narrow-line Seyfert 1 galaxies – rebels of the AGN family, 28th Texas Symposium on Relativistic Astrophysics, Geneva, Switzerland, December 13-18, 2015.

Järvelä, E. Contributed talk: Narrow-line Seyfert 1 galaxies – rebels of the AGN family, (Always Look on) The Bright Side of Space, Tartu-Tuorla meeting, Võru, Estonia, September 22-25, 2015.

Järvelä, E. Contributed talk: Narrow-line Seyfert 1 galaxies – multifrequency properties and

large-scale environments, Finnish-Russian Symposium, Pulkovo Observatory, St. Petersburg, Russia, May 25-29, 2015.

Järvelä, E. and Lähteenmäki, A. Poster: Properties of Narrow-line Seyfert 1 galaxies – fitting the misfits into the AGN scenario, Unveiling the AGN – Galaxy Evolution Connection, Puerto Varas, Chile, March 9-13, 2015.

Järvelä, E. Contributed talk: Statistical multifrequency study of Narrow-Line Seyfert 1 galaxies, Young European Radio Astronomers Conference 2014, Toruń, Poland, September 8-12, 2014.

NATIONAL
MEETINGS AND
CONFERENCES

Järvelä, E., Lähteenmäki A. and Berton M. Contributed talk: Near-infrared morphologies of jetted narrow-line Seyfert 1 galaxies, Astronomers' Days 2018, Kuusamo, Finland, May 28-30, 2018.

Järvelä, E. Contributed talk: Multivariable studies of narrow-line Seyfert 1 galaxies, Astronomers' Days 2016, Tampere, Finland, May 23-25, 2016.

Järvelä, E. Contributed talk: Properties of Narrow-line Seyfert 1 galaxies – fitting the misfits into the AGN scenario, FinCOSPAR 2015, Luosto, Sodankylä, Finland, August 26-28, 2015.

Järvelä, E. Contributed talk: Statistical multifrequency study of Narrow-Line Seyfert 1 galaxies, Astronomers' Days 2014, Savonlinna, Finland, May 26-28, 2014.

Järvelä, E. and León-Tavares, J. Contributed talk: Narrow-Line Seyfert 1 galaxies - γ -ray emitting spirals, Astronomers' Days 2012, Porvoo, Finland, June 4-6, 2012.

INTERNATIONAL
SCHOOLS

Post-Alpbach 2015, Quantum Physics and Fundamental Physics in Space – JANOS mission, Graz, Austria, November 22-27, 2015.

Summer School Alpbach 2015, Quantum Physics and Fundamental Physics in Space, Alpbach, Austria, July 14-23, 2015.

THESES

Järvelä, E. Narrow-line Seyfert 1 galaxies: Observational and statistical analysis. *Doctoral dissertation (article)*. Aalto University Metsähovi Radio Observatory, Kylmälä, and Department of Electronics and Nanoengineering, Espoo, Finland.

Järvelä, E. Multifrequency study of narrow-line Seyfert 1 galaxies. *Master's thesis*. University of Helsinki, Helsinki, Finland.

Järvelä, E. Dark matter in galaxy clusters. *Bachelor's thesis*. University of Helsinki, Helsinki, Finland.